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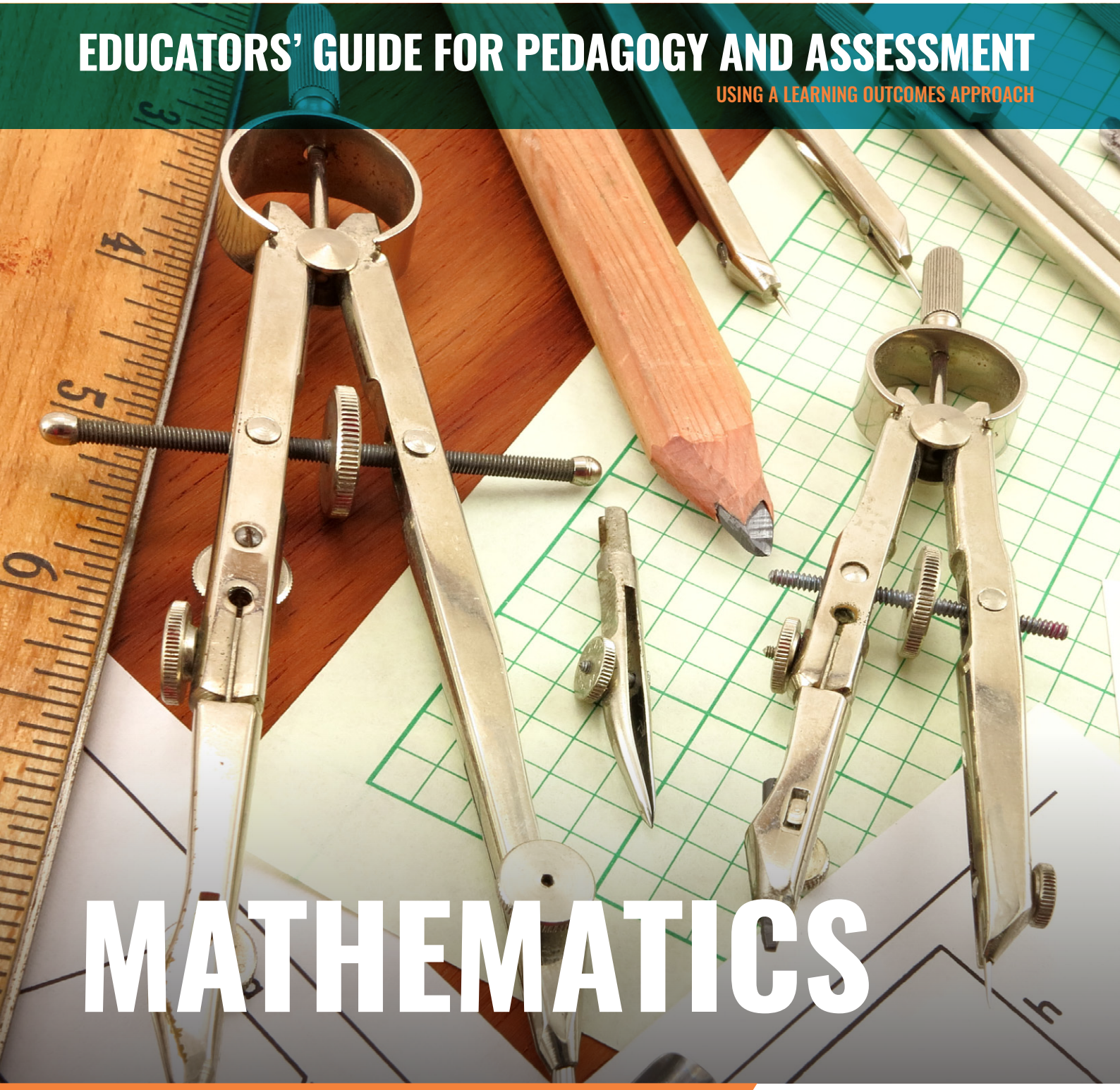
EDUCATORS' GUIDE FOR PEDAGOGY AND ASSESSMENT

USING A LEARNING OUTCOMES APPROACH



MATHEMATICS

LEVELS 5 6 7 8 9 10

Learning Outcomes Framework

Learning Outcomes Framework

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Contents

Introduction 5

1. Subject Learning Outcomes 9

2. Pedagogy

A. Pedagogy and good practice learning 40
B. Embedding the delivery of the Cross Curricular Themes 43
C. Reaching different learners within each level 48
D. Teaching different levels within one year group 53
E. Teaching one level across two year groups 54

3. Assessment

A. Methodologies that will ensure fit for purpose assessment 56
B. Inclusive assessment methodologies 62
C. Reliable and valid ways of assessment 64
D. Assessing Cross Curricular Themes 66
E. Reporting Progress 67

References 70

Appendix: Cross Curricular Themes 72

Introduction

Following the endorsement of the National Curriculum Framework (NCF) in 2012, an ambitious plan was launched with the aim of putting theory into practice. Built upon the National Minimum Curriculum (2000), it addressed the gaps in Malta's learning processes where emphasis shifted from teaching the subject to teaching the learner.

The National Minimum Curriculum framework took important policy-related documents issued by the European Commission into consideration. These included the *Key Competences for Lifelong learning – A European Reference Framework* (included in the annex of the Recommendations; 2006/962/EC); the *Strategic Framework for European Cooperation in Education and Training* (ET 2020; 2009) and *Europe 2020 – A Strategy for Smart Sustainable and Inclusive Growth* (COM (2010) 2020) which is the follow up to the *Lisbon Strategy for Growth and Jobs (Memo 06/478/12 Dec 2006).*

Against the background of Malta's historical development and on the basis of the curriculum and EU documentation the NCF seeks to provide strategic direction by rationalising the necessary changes and their implications for area/subject content, pedagogies and assessment. The NCF was presented within a lifelong learning perspective and celebrates diversity by catering for all learners at each stage of their education. It aims to introduce more equity and decentralisation in the national system. The NCF seeks to present a seamless curriculum which reflects smooth transitions, building and extending on the firm foundations in early childhood education. In essence, the NCF aims to provide a quality education for all learners, reducing the percentage of early school leavers and encouraging their enrolment in further and higher education.

The NCF proposed a Learning Outcomes Framework (LOF) as the keystone for learning and assessment throughout the years of compulsory schooling. The aim of the Learning Outcomes Framework is to free schools and learners from centrally-imposed knowledge-centric syllabi and to give them the freedom to develop programmes that fulfil the framework of knowledge, attitudes and skills-based outcomes that are considered national education entitlement of all learners in Malta. The LOF is thus intended to eventually lead to more curricular autonomy of colleges and schools so as to better address the learning needs of their learners.

A number of other local policy documents published in recent months have also contributed to the need of a learning outcomes-based approach in today's educational structures. In particular, the *Framework for the Education Strategy for Malta 2014 – 2024* (2014), *A National Literacy Strategy for All in Malta and Gozo 2014 – 2019* (2014), *A Strategic Plan for Early School Leaving in Malta 2014* (2014), *Education for All: Special Needs and Inclusive Education in Malta* (2014), *Malta National Lifelong Learning Strategy 2020* (2015) and *Respect for All Framework* (2015) all point toward the need to provide equitable opportunities for all learners to achieve educational outcomes at the end of their schooling which will enable them to participate in lifelong and adult learning, reduce the high incidence of early school leaving and ensure that all learners attain key competences in literacy, numeracy, science and technology.

The ESF 1.228 Project – *Design of Learning Outcomes Framework, Associated Learning and Assessment Programmes and Related Training* is intended to deliver this Learning Outcomes Framework approach to the educators and all relevant stakeholders within compulsory schooling. It addresses the holistic development of all learners and advocates a quality education for all as part of a coherent strategy for lifelong learning which aims to ensure that all children have the opportunity to obtain the necessary skills and attitudes to be future active citizens and to succeed at work and in society irrespective of socio-economic, cultural, racial, ethnic, religious, gender and sexual status.

The LOF will allow for flexibility in teaching and learning programmes in order to address specific needs and to build upon strengths within the context of the learning communities in different colleges and schools. This concept of flexibility is promoted throughout the entire framework. While acknowledging that out-of-school factors such as poverty and social exclusion affect learner achievement, the LOF seeks to improve learners' learning experiences by encouraging creativity, critical literacy, entrepreneurship and innovation at all levels. This will allow learners to reach their potential by connecting what they have learnt to their individual contexts. Consequently, this will help learners develop a positive attitude towards learning and a greater appreciation of its usefulness.

The move from a prescriptive content-based curriculum towards a learning outcomes approach will impact all programmes in schools and all external examinations and assessment at the end of compulsory education in Malta.

The LOF was also designed to meet the four broad education goals outlined in the *Education Strategy for Malta 2014 – 2024* (Ministry for Education and Employment, 2014), namely to:

- reduce the gaps in educational outcomes between boys and girls and between students attending different schools, decrease the number of low achievers, raise the bar in literacy, numeracy and science and technology competence and increase student achievement.
- support educational achievement of children at-risk-of-poverty and from low socio-economic status and reduce the relatively high incidence of early school-leavers.
- increase participation in lifelong learning and adult learning.
- raise levels of learner retainment and attainment in further, vocational and tertiary education and training.

The Learning and Assessment Programmes (LAPs) which were drawn up for each subject will ensure that the focus is on the learner. As such, learning activities will be geared to stimulate creativity and imagination; enable learners to make correct value judgements when editing/correcting their own work; develop learners' investigative and constructive skills by making use of different media and promote receptive skills (listening and reading) which lead to productive skills (speaking and writing). LAPs are also intended to create an atmosphere where learners develop their own problem solving skills and their ability to think and reason logically; reflect on outcomes and consequences and explore possible alternatives and apply interesting and realistic contexts that are personally meaningful to them.

With the use of LAPs, teachers will be encouraged to create situations and resources which are intrinsically interesting, culturally embedded and cognitively engaging and enable learners to connect the various types of information that they have acquired.

THE LEARNING AND ASSESSMENT PROGRAMME FOR MATHEMATICS

This document, which is aimed at policy makers, educators and teachers in the classroom, presents the Learning and Assessment Programme (LAP) for Mathematics.

The LAP comprises:

- **The Learning Outcomes Framework (LOF)** - this encompasses a set of subject learning outcomes (SLOs) that set out what a learner is expected to know, understand or be able to do as a result of a process of learning. These learning outcomes are designed to be used in a range of delivery contexts and taught using different methods. They state the end result rather than describe the learning process or the learning activities.
- **Notes on Pedagogy and Assessment** - the learning outcomes are written in a way that sets clear expectations. Schools are now invited to develop assessment strategies with the aim to make it easy for teachers to assess each and every outcome. In order to make it easier for schools to do so this document sets down good practice teaching and assessment guidelines which educators may wish to take on board and adapt to meet the needs of their learners.

This document has been collaboratively developed by the Outlook Coop Learning Outcomes Framework Joint Venture comprising Outlook Coop as the lead partner, East Coast Education Ltd. and the University College London Institute of Education together with the Directorate for Quality and Standards in Education (DQSE). Mr Barry Smith (Joint Venture Technical Director), Mr Godfrey Kenely (Joint Venture Contract Director), Dr Michelle Attard Tonna (Head of Project) and Mr Gaetano Bugeja (Project Leader) directed the project experts.

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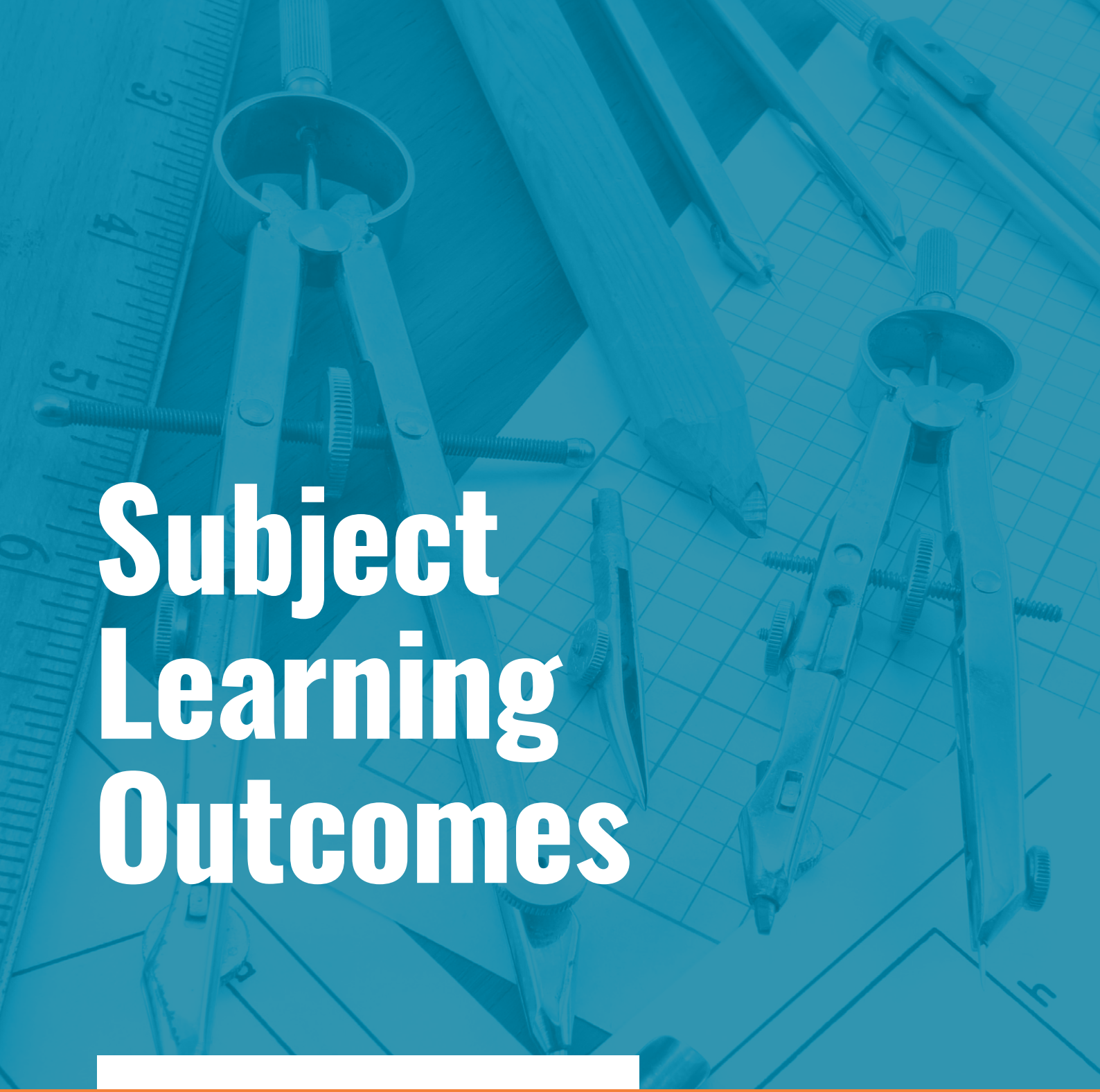

Subject Learning Outcomes

MATHEMATICS

LEVELS 5 6 7 8 9 10

The Subject Learning Outcomes (SLOs) for Mathematics span from Attainment Level 5 to Attainment Level 10.

Within the Learning Outcomes Framework, Level 10 is viewed as the 'gifted and talented' level. Outcomes within this level sit at the upper end of the ability spectrum and extend learners further.

The core concept is *better* rather than *more.* At Level 10 learners demonstrate a deeper understanding and wider application of Level 9 content which marks the end of compulsory schooling. Level 10 outcomes may draw on three main areas:

- increased sophistication of understanding of the Level 9 content
- greater learning autonomy in developing understanding and skills
- increased application and problem solving.

It should be noted that each Attainment Level can be extended further and suggestions for this will be included in the Pedagogy and Assessment section of the document.

LEVEL 5

Subject Focus: Number - The number system

1. I can read, write and order whole numbers to ten thousand in figures and words.
   WRITING
2. I can recognise, read and position whole numbers on a number line.
   COGNITIVE LEARNING
3. I can understand the place value of any digit in a whole number up to ten thousand.
4. I can compare and order whole numbers up to ten thousand and include symbols such as <, > or =.
5. I can read, say, order and write ordinal numbers to one hundred.
   WRITING
6. I can identify odd and even numbers to ten thousand.
7. I can count forward and backwards in 1s, 2s, 10s and 100s starting from any whole number less than or equal to 1000.
   WRITING
8. I can count forward and backwards in steps of 3, 4, or 5 to and from any whole number less than or equal to 50.
   WRITING
9. I can count forward/backwards in steps of 25 and 50 to/from 500.
   WRITING
10. I can recall the first ten multiples of the following numbers: 2, 3, 4, 5, 8 & 10.
11. I can understand what a half and a quarter are and can recognise them in shapes and in small numbers of objects.
12. I can understand that 0.1 represents a tenth.
13. I can understand that 0.5 represents a half.
    COGNITIVE LEARNING
14. I can recognise simple fractions that are parts of a whole.
    COGNITIVE LEARNING
15. I can recognise mixed numbers which include a whole number and a fraction.
    COGNITIVE LEARNING
16. I can recognise and use simple equivalent fractions.
    COGNITIVE LEARNING
17. I can compare and order simple fractions and position them on a number line.
18. I can state one number lying between two whole numbers.

Subject Focus: Number - The number system (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other learning resources *e.g. Cuisenaire rods, Unifix cubes* to learn about numbers and their properties.

Subject Focus: Number - Numerical calculations (Whole Numbers, Decimal Numbers & Fraction Numbers - The Four Operations)

1. I can add 100 or 1,000 to any whole number.
   COGNITIVE LEARNING
2. I can understand that I can add numbers in any order and get the same result.
   COGNITIVE LEARNING
3. I can work out a small difference by counting up from the smaller to the larger number.
4. I can understand that subtraction is the inverse of addition and vice versa. I can also state and write a substraction statement corresponding to a given addition statement and vice versa *e.g. if 4 + 3 = 7 then 7 - 3 = 4 and vice versa.*
   COGNITIVE LEARNING
5. I can add/subtract 9 or 11 by adding/subtracting 10 and then adjusting by 1.
   COGNITIVE LEARNING
6. I can use column addition and subtraction with up to three-digit numbers.
   COGNITIVE LEARNING
7. I can work through situations involving addition and subtraction with two-digit numbers.
   COGNITIVE LEARNING
8. I can derive all pairs of 100 in multiples of 5 and 10.
   COGNITIVE LEARNING
9. I can derive all number pairs that total 100.
   COGNITIVE LEARNING
10. I can derive all pairs of multiples of 50 with a total of 1000.
    COGNITIVE LEARNING
11. I can derive all pairs of multiples of 100 with a total of 1000.
12. I can understand that multiplication is multiple groups or repeated addition.
    COGNITIVE LEARNING
13. I can understand that I can multiply numbers in any order and get the same result.
    COGNITIVE LEARNING
14. I can understand division as equal sharing.
    COGNITIVE LEARNING
15. I can understand division as equal grouping or repeated subtraction.
    COGNITIVE LEARNING
16. I can understand that division is the inverse of multiplication. I can also state and write a division statement corresponding to a given multiplication statement *i.e 2, 3, 4, 5 and 10 multiplication facts*, and vice versa *e.g. if 4 × 3 = 12 then 12* ÷ 3 = 4 and vice versa.
    COGNITIVE LEARNING
17. I can mentally multiply an integer by multiples of 10 and 100.
    COGNITIVE LEARNING
18. I can recognise unit fractions such as ½ and ¼ and use them to find fractions of shapes and numbers. I can also understand the relationship between fractions such as ½ and ¼ and division *e.g. ½ means 1 ÷ 2 and vice versa.*
    COGNITIVE LEARNING
19. I can double whole numbers up to 500.
    COGNITIVE LEARNING
20. I can halve even numbers up to 500.
21. I can understand halving as the inverse of doubling.
    COGNITIVE LEARNING

22. I can find remainders after division, restricted to dividends up to 100 and divisors up to 10.
    COGNITIVE LEARNING
23. I can work through simple one-step situations using addition, subtraction, multiplication and/or division. I can also give a rough estimate of the answer of such situations and I can check the reasonableness of the answer.
24. I can round any whole two-digit number to the nearest ten and any three-digit number to the nearest hundred.
25. I can find fractions of shapes and simple whole numbers.
    COGNITIVE LEARNING
26. I can read and interpret scales involving whole numbers.
    READING AND UNDERSTANDING

Subject Focus: Number - Numerical calculations (Money & Consumer Mathematics)

1. I can understand that 1 euro is equal to 100 cent.
2. I can work out totals up to a hundred euro and give the correct change.
3. I can handle small amounts of money in classroom situations *e.g. keeping track of money collected from small change for charity money collections*.
4. I can plan an activity within a given budget *e.g. using tickets, travel brochures, price lists, menus ...*
5. I can use receipts, simple menus, entrance tickets to work out totals and change.
6. I can understand that prices marked as €0.99 are a marketing strategy to make prices more attractive.

Subject Focus: Number - Numerical calculations (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. Cuisenaire rods, Unifix cubes, base 10 blocks* appropriate to this level to calculate and to learn about numerical calculations.

Subject Focus: Algebra – Fundamentals of Algebra

1. I can recognise and extend simple pictorial patterns and number sequences formed by counting any positive integer in constant steps.
2. I can recognise the use of an empty box symbol to stand in for an unknown number and can find the unknown number.
    COGNITIVE LEARNING

Subject Focus: Algebra – Fundamentals of Algebra (Assistive Technology & Other Resources)

1. I can use assisitive technology *e.g. tablets and computers* and other resources appropiate to this level to learn about the fundamentals of algebra.

Subject Focus: Shape, space and measures – Measures (Angles)

1. I can show and label the four compass points.
    COGNITIVE LEARNING
2. I can understand that a right angle is a quarter of a whole turn and can recognise such angles in 2D shapes and in the environment.
    COGNITIVE LEARNING
3. I can make and describe right angle turns including turns between the four compass points.
    COGNITIVE LEARNING
4. I can recognise, measure and draw angles of 90° and 180° without the use of a protractor.
    COGNITIVE
5. I can compare an angle with a right angle.

Subject Focus: Shape, space and measures – Measures (Length, Area, Volume, Mass & Capacity)

1. I can understand that the length of an object is a measure of distance between the endpoints of an object.
2. I can understand that the mass of an object is a measure of the amount of material in an object.
3. I can understand that the capacity of a container is the total amount of fluid that can be poured into the container.
4. I can read and write the vocabulary related to length, mass and capacity.
    WRITING
5. I know the standard metric units of length *i.e kilometres, metres, centimetres and millimetre*; mass *i.e kilograms and grams*; and, capacity *i.e litres and millilitres*. I also know the abbreviations of these standard units and I can understand the relationships between different units of the same measure.
    COGNITIVE LEARNING
6. I can estimate, measure and compare lengths, masses, and, capacities.
    COGNITIVE LEARNING
7. I can use the decimal notation to express measures of length, mass and capacity.
8. I can convert and use larger to smaller standard metric units of mass *i.e. kg, g*), length; *i.e.km, m, cm, mm*; and capacity *i.e. l, ml, and vice versa*.
9. I can suggest and use measuring eauipement to estimate and/or measure length mass and capacity.
10. I can draw a line to the nearest centimetre.

Subject Focus: Shape, space and measures – Measures (Time)

1. I can read and write the vocabulary related to time.
    WRITING
2. I can use standard units of time and know the relationships between them.
3. I can convert and use larger to smaller standard units of time *i.e hours, minutes and seconds, and vice versa.*
4. I can read and use the 12 hour clock in both analogue and digital.
5. I can read and use a calendar.
    READING AND UNDERSTANDING
6. I can estimate and measure time using seconds, minutes and hours.
    COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Measures (Assistive Technology & Other Resources)

1. I can use assisitive technology *e.g. tablets and computers* and other resources *e.g. plactic money, cardboard clocks, 2D and 3D plastic shapes, measuring instruments* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Euclidean geometry (Lines & Lines Segments)

1. I can describe and draw pictures and patterns.
    COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Triangles)

1. I can recognise, name, draw and describe the simple 2D shape: the triangle.
    COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Quadrilaterals)

1. I can recognise, name, sketch and describe the simple 2D shapes: the square and the rectangle.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Polygons)

1. I can sort, and classify simple 2D shapes using their various properties.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (3D Shapes)

1. I can recognise and name the simple 3D shapes: the cube and the cuboid.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Transformation geometry (Movement)

1. I can understand what right, left, up and down mean and can move an object in each of these directions. I can also describe the movement of the object in each of these directions.
   COGNITIVE LEARNING
2. I can read and write the vocabulary related to position, direction and movement.
   WRITING
3. I can describe and find the position of a square on a grid of squares with rows and columns labelled.

Subject Focus: Shape, space and measures – Transformation geometry (Reflections)

1. I can recognise reflective symmetry in a square.
   COGNITIVE LEARNING
2. I can identify and draw lines of symmetry in simple 2D shapes.
   COGNITIVE LEARNING
3. I can recognise shapes with no, one and two lines of symmetry.
   COGNITIVE LEARNING
4. I can draw the other half of a simple symmetrical object inspired by examples of symmetry in nature.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Rotations)

1. I can describe right angle rotations.

Subject Focus: Shape, space and measures – Transformation geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about transformation geometry.

Subject Focus: Data handling and chance – Statistics

1. I can collect, sort, organise and classify data in a table.
2. I can read and interpret a frequency table.
3. I can complete a frequency table.
4. I can read and interpret a block graph.
    COGNITIVE LEARNING
5. I can construct a block graph.
    PRACTICAL
6. I can work through a situation by representing and interpreting data in tables, graphs and charts.
    COGNITIVE LEARNING
7. I can read and interpret a pictograph where the symbol represents one or two units.
8. I can draw a pictograph where the symbol represents one or two units.
9. I can read and interpret a Carroll diagram.
    COGNITIVE

Subject Focus: Data handling and chance – Statistics (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other learning resources to learn about statistics.

Subject Focus: Data handling & chance – Probability (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other learning resources to learn about probability.

LEVEL 6

Subject Focus: Number - The number system

1. I can read, write and order whole numbers to one milion in figures and words.
   WRITING
2. I can recognise, read and position numbers on a number line.
   COGNITIVE LEARNING
3. I can understand the place value of any digit in a whole number up to one million.
4. I can compare and order whole numbers up to one million and include symbols such as <, > or =.
5. I can identify odd and even numbers.
6. I can count forward and backwards in 1s, 2s, 10s and 100s starting from any whole number.
   WRITING
7. I can count forward and backwards in steps of 3, 4, or 5 to and from any whole number.
   WRITING
8. I can count forward/backwards in steps of 25 and 50.
   WRITING
9. I can recall the first ten multiples of the following numbers: 6, 7 & 9.
10. I can list the first five multiples of any whole numbers up to and including 100.
11. I can identify common multiples of two numbers.
12. I can identify the least common multiple (LCM) of two numbers.
13. I can identify factors of any two-digit number.
14. I can understand, can generate and can recall the first ten square numbers.
    COGNITIVE LEARNING
15. I can understand, can generate and can recall the first five cube numbers.
    COGNITIVE LEARNING
16. I can use decimal notation for tenths and hundredths and know what each digit represents.
17. From a one-digit number I can count forward and backwards in steps of 0.1, 0.2, 0.25 and 0.5.
18. I can recognise and extend number sequences and predict the next few terms.
    COGNITIVE LEARNING
19. I can understand that 0.01 represents a hundredth.
20. I can understand that 0.25 represents a quarter and 0.75 represents three quarters.
    COGNITIVE LEARNING
21. I can read and use the terms ‘simple fraction’, ‘numerator’ and ‘denominator’.
22. I can read and use the term ‘mixed numbers’.
23. I can recognise, use and generate equivalent fractions.
    COGNITIVE LEARNING
24. I can compare and order simple fractions, mixed numbers and decimals, and position them on a number line.
    COGNITIVE LEARNING
25. I can understand that those simple fractions which have a denominator which is a factor of 100 can also be expressed as decimals.
26. I can understand the relationship between fractions and decimals.
27. I can state one number lying between two given decimal numbers.

Subject Focus: Number - The number system (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other learning resources *e.g. Cuisenaire rods, Unifix cubes, base 10 blocks* to learn about numbers and their properties.

Subject Focus: Number - Numerical calculations (Whole Numbers, Decimal Numbers & Fraction Numbers - The Four Operations)

1. I can add or subtract by using the nearest multiple of 10, 100 or 1000 then adjusting *e.g. 14 + 8 = 14 + 10 − 2*.
    COGNITIVE LEARNING
2. I can use column addition and subtraction with up to four-digit numbers.
    COGNITIVE LEARNING
3. I can work through situations involving addition and subtraction with three-digit numbers.
    COGNITIVE LEARNING
4. I can understand that division is the inverse of multiplication. I can also state and write a division statement corresponding to a given multiplication statement such as 6, 7, 8, and 9 multiplication facts, and vice versa.
    COGNITIVE LEARNING
5. I can multiply and divide any integer by 10, 100, and 1000.
6. I can recognise unit fractions, such as *1/5*, *1/8*, *1/10*, *1/100,* and use them to find fractions of shapes, numbers and quantities. I can also understand the relationship between fractions such as *1/5*, *1/8*, *1/10*, *1/100,* and division, *e.g. what is $^{1}/_{8}$ of 32 ? Therefore, what is $^{5}/_{8}$ of 32 ?*
7. I can find remainders after division and express the remainder as a fraction.
    COGNITIVE LEARNING
8. I can work through simple two-step situations using addition, substration, multiplication and/or division. I can also give a rough estimate of the answer of such situations and I can check the reasonableness of the answer.
9. I can round any whole number to the nearest ten, hundred and thousand.
10. I can round remainders to the nearest whole number depending on the context.
11. I can write tenths and hundredths in decimal form and vice versa.
     COGNITIVE LEARNING
12. I can add and subtract whole and decimal numbers up to two decimal places using informal methods.
13. I can use column addition or subtraction methods using decimal numbers up to two decimal places.
     COGNITIVE LEARNING
14. I can derive quickly decimals that total 1 or 10.
15. I can use written methods for Th.H.T.U.xU., H.T.U.xT.U., U.t.xU., H.U.t.x U., U.t.h.xU.
16. I can use written methods for T.U.÷U., H.T.U.÷U., H.T.U.÷T.U.,U.t.÷U., U.t.h.÷U.
17. I can use written method for multiplication and division by 10 and 100 including decimals.
18. I can derive doubles of whole and decimal numbers.
     COGNITIVE LEARNING
19. I can derive halves of whole and decimal numbers.
     COGNITIVE LEARNING
20. I can use brackets to order operations on positive numbers.
21. I can round a decimal number with two decimal places to the nearest tenth or to the nearest whole number.
22. I can find fractions of whole numbers.
     COGNITIVE LEARNING
23. I can use simple fractions and mixed numbers.
     COGNITIVE LEARNING
24. I can reduce a fraction to its simplest form.
     COGNITIVE LEARNING
25. I can change an improper fraction into a mixed fraction and vice versa.
     COGNITIVE LEARNING
26. I can read and interpret scales involving fractions.
     READING AND UNDERSTANDING

Subject Focus: Number - Numerical calculations (Money & Consumer Mathematics)

1. I can convert euro to cent and vice versa.
2. I can work out totals of up to ten thousand euro and give the correct change.
3. I can calculate, compare and discuss special offers.
    MANAGING LEARNING

Subject Focus: Number - Numerical calculations (Ratio & Proportion)

1. I can use simple proportion, using equivalent fraction, to solve simple problems *e.g. What is the value of □ in 1/3 = □/6*
2. I can work through simple situations that involve direct proportion when unknown quantities are simple multiples of known quantities *e.g. A cup cakes recipe uses 2 eggs to make 10 cup cakes. How many eggs will be needed to make 25 cup cakes ?*

Subject Focus: Number - Numerical calculations (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. Cuisenaire rods, Unifix cubes, base 10 blocks* appropriate to this level to calculate and to learn about numerical calculations.

Subject Focus: Algebra – Fundamentals of Algebra

1. I can recognise and extend pictorial patterns and square number sequences.
2. I can work through an equation where there are pictures instead of numbers.
    COGNITIVE LEARNING
3. I can locate position on a grid with labelled rows and columns.

Subject Focus: Algebra – Fundamentals of Algebra (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources appropiate to this level to learn about the fundamentals of algebra.

Subject Focus: Shape, space and measures – Measures (Angles)

1. I can show and label the eight compass points.
    COGNITIVE LEARNING
2. I can understand that a whole turn is the same as 4 right angles and half a whole turn is the same as 2 right angles. I can also recognise that 4 right angles preserve direction while 2 right angles reverse direction *e.g. using Probot.*
    COGNITIVE LEARNING
3. I can understand that an angle is a measure of turn and can describe it.
    COGNITIVE LEARNING
4. I can estimate, sort, measure and draw angles up to and including 180° with a protractor including a margin of error: +/- 5°.
5. I can identify and distinguish between acute and obtuse.

Subject Focus: Shape, space and measures – Measures (Length, Area, Volume, Mass & Capacity)

1. I can understand that the area is a measure of the amount of surface of a flat shape.
2. I can read and write the vocabulary related to area.
   WRITING
3. I know the standard metric units of area *i.e. square kilometres, square metres, square centimetres and square millimetres*; and, volume *i.e. cubic metres, cubic centimetres and cubic millimetres*. I also know the abbreviation of these standard units and I understand the relationships between different units of the same measure.
   COGNITIVE LEARNING
4. I can estimate, measure and compare areas.
   COGNITIVE LEARNING
5. I can use the decimal notation to express measures of area.
6. I can understand that perimeter is the edge of a shape.
   COGNITIVE LEARNING
7. I can identify the perimeters of regular and irregular polygons and can measure and calculate their lengths.
8. I can work out the areas of squares and rectangles by counting squares on a grid.
   COGNITIVE LEARNING
9. I can find the area of squares and rectangles by using the fomula: length x breadth.
   COGNITIVE LEARNING
10. I can work out the area of a right angled triangle by considering it as half a rectangle.
11. I can find the area of compound shapes that are made up of squares and rectangles.

Subject Focus: Shape, space and measures – Measures (Time)

1. I can read and use the 24 hour clock in both analogue and digital.
2. I can read and use a timetable and a timeline.
   READING AND UNDERSTANDING

Subject Focus: Shape, space and measures – Measures (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. plastic money, cardboard clocks, 2D and 3D plastic shapes, measuring instruments* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Euclidean geometry (Lines & Lines Segments)

1. I can recognise and draw examples of horizontal and vertical lines.
   COGNITIVE LEARNING
2. I can recognise and draw examples of parallel and perpendicular lines.

Subject Focus: Shape, space and measures – Euclidean geometry (Angles)

1. I can understand that the angles on a straight line add up to 180°. I can also work out the size of missing angles in diagrams showing angles on a straight line.
   COGNITIVE LEARNING
2. I can understand that the angles around a point add up to 360°. I can also work out the size of missing angles in diagrams showing angles at a point.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Triangles)

1. I can classify triangles according to the length of their sides and the size of their angles i.e scalene, isosceles, equilateral and right-angled triangles.
   COGNITIVE LEARNING
2. I can understand and know that the sum of the angles of a triangle is 180°. I can also work out the size of missing angles in triangles.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Quadrilaterals)

1. I can draw squares and rectangles given the lengths of the sides.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Polygons)

1. I can sort, name and classify polygons using properties such as the number of sides and the size of the interior angles.
   COGNITIVE LEARNING
2. I can understand the terms 'regular' and 'irregular polygon'.
   READING AND UNDERSTANDING

Subject Focus: Shape, space and measures – Euclidean geometry (3D Shapes)

1. I can recognise and name the simple 3D shapes: the cylinder, cone, triangular prism and square-based pyramid.
   COGNITIVE LEARNING
2. I can visualise the simple 3D shapes from 2D drawings.
   COGNITIVE LEARNING
3. I can identify and count faces, vertices and edges of simple 3D shapes.
4. I can identify possible and impossible nets for a closed and an open cube.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Circles)

1. I can recognise, name and draw the simple 2D shape: the circle.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Transformation geometry (Reflections)

1. I can recognise reflective symmetry in regular polygons.
   COGNITIVE LEARNING
2. I can identify and draw lines of symmetry in triangles and quadrilaterals.
3. I can classify triangles using reflective symmetry.
4. I can complete symmetrical patterns given one and two lines of symmetry at right angles.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Rotations)

1. I can describe half-right angle rotations.
2. I can describe 90° and 180° rotations both clockwise and anticlockwise. I can also describe 45°, 135°, 225°, 270° and 315° rotations both clockwise and anticlockwise.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about transformation geometry.

Subject Focus: Data handling and chance – Statistics

1. I can construct a frequency table using a tally column.
2. I can read and interpret a bar chart and a bar-line graph.
   COGNITIVE LEARNING
3. I can construct a bar chart and a bar-line graph.
   PRACTICAL
4. I can work through a situation by representing and interpreting data in tables, graphs, charts and diagrams.
   COGNITIVE LEARNING
5. I can read and interpret a pictograph where the symbol represents a number of units.
   COGNITIVE LEARNING
6. I can draw a pictograph where the symbol represents a number of units.
   PRACTICAL
7. I can complete a given Carroll diagram.
   PRACTICAL
8. I understand what the mean of a set of data represents.

Subject Focus: Data handling and chance – Statistics (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other learning resources to learn about statistics.

Subject Focus: Data handling & chance – Probability (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other learning resources to learn about probability.

LEVEL 7

Subject Focus: Number - The number system

1. I can read, write and order whole numbers to one billion in figures and words.
   WRITING
2. I can understand the place value of any digit in a whole number up to one billion.
3. I can compare and order whole numbers up to one billion and include symbols such as <, > or =.
4. I can list the first five multiples of any whole number.
5. I can identify common multiples of three numbers.
6. I can identify the least common multiple (LCM) of three numbers.
7. I can identify all factors of any two-digit number.
8. I can understand that squares and square roots are inverses of each other.
   COGNITIVE LEARNING
9. I can understand that cubes and cube roots are inverses of each other.
10. I can understand what a prime number is and can identify prime numbers up to hundred.
11. I can use decimal notation for tenths, hundredths and thousandths and know what each digit represents.
12. From a two-digit number I can count forward and backwards in steps of 0.1, 0.2, 0.25 and 0.5.
13. I can understand that 0.001 represents a thousandth.
    COGNITIVE LEARNING
14. I can understand that 0.333... represents a third and 0.666... represents two thirds.
    COGNITIVE LEARNING
15. I can understand percentage as the number of parts in every hundred. Hence, I can understand that 1% represents a hundredth.
16. I can understand that 25% represent a quarter, 50% represents a half and 75% represents three quarters.
17. I can understand the relationship between fractions, decimals and percentages.
18. I can understand that those simple fractions which have a denominator which is a factor of 100 can also be expressed as percentages.
19. I can state one number lying between two given fractions.
20. I can recognise, understand and use directed numbers in real life situations such as temperature changes and global warming.
21. I can find missing quantities in a given ratio.
22. I can divide quantities in a given ratio.

Subject Focus: Number - The number system (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources *e.g. Cuisenaire rods, Unifix cubes, base 10 blocks* to learn about numbers and their properties.

Subject Focus: Number - Numerical calculations (Whole Numbers, Decimal Numbers & Fraction Numbers - The Four Operations)

1. I can use assistive technology to add and subtract numbers that involve four or more digits.
   MANAGING LEARNING
2. I can work through situations involving addition and subtraction with four or more digit numbers.
   COGNITIVE LEARNING
3. I can recognise unit fractions and use them to find fractions of shapes, numbers and quantities. I can also understand the relationship between division and fractions *e.g.* $^{2}/_{3}$ *means 2 ÷ 3 and vice versa.*
4. I can halve odd numbers up to 500.
5. I can find remainders after division and express the remainder as a decimal up to two decimal places.
   COGNITIVE LEARNING

6. I can work through complex situations involving, addition, subtraction, multiplication and/or division. I can also give a rough estimate of the answer of such situations and I can check the reasonableness of the answer.
7. I can round any whole number to the nearest ten, hundred, thousand and ten thousand.
8. I can work out mentally the square root of squares up to 100 and the cube root of cubes up to 125 without a calculator and use a calculator for other values.
   COGNITIVE LEARNING
9. I can use primes to write numbers as a product of prime factors.
10. I can work out calculations involving least common multiples.
11. I can use column addition or subtraction methods using decimal numbers up to three decimal places.
    COGNITIVE LEARNING
12. I can understand the partitioning method and the standard written method when multiplying a whole number by two-digit number.
13. I can use the BIDMAS rule with both positive and negative numbers.
14. I can round any decimal number to three decimal places.
15. I can find fractions of a number without using assistive technology.
16. I can change fractions into decimals and vice versa.
17. I can read and interpret scales involving decimals.
    READING AND UNDERSTANDING
18. I can find all the equivalent fractions of a given fraction.
19. I can add and subtract two fractions with different denominators using equivalent fractions.
20. I can work through situations involving the addition, subtraction, multiplication and division of fractions.

Subject Focus: Number - Numerical calculations (Percentages)

1. I can find simple percentages of whole number quantities.
   COGNITIVE LEARNING
2. I can convert percentages to fractions and vice versa.
3. I can find simple percentages of quantities.
4. I can express a quantity as a percentage of another.
5. I can find percentage increase and percentage decease.

Subject Focus: Number - Numerical calculations (Money & Consumer Mathematics)

1. I can use published exchange rates to convert from one currency to another.
2. I can work out totals of up to one hundred thousand euro and give the correct change.
3. I can work through simple situations involving personal and household finance *e.g. pocket money invested in a bank account, finding out how much it will cost to prepare a meal,* calculating which item is the best buy when items come in various sizes *e.g. oil in one litre bottles vs oil in two litre bottles*.

Subject Focus: Number - Numerical calculations (Ratio & Proportion)

1. I can write ratios in their simplest form.
   COGNITIVE LEARNING
2. I can find one quantity of a ratio given the other and divide a quantity in a given ratio.
3. I can use ratio to solve simple problems.
4. I can understand and can use simple map ratios.
5. I can use simple proportion through using ratio notation to solve simple problems *e.g. What is the value of □ in 1:3 = □:6 ?*
6. I can work through simple situations that involve direct proportion using the unitary method, including price, distance, time, weight and capacity.

Subject Focus: Number - Numerical calculations (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources *e.g. Cuisenaire rods, Unifix cubes, base 10 blocks* appropriate to this level to calculate and to learn about numerical calculations.

Subject Focus: Algebra – Fundamentals of Algebra

1. I can recognise and extend complex pictorial patterns and numbers sequences.
2. I can use letters to represent two or more unknown values in algebraic expressions involving +, −, x and ÷.
    WRITING
3. I can derive a formula from a situation involving two or more unknown values with positive and negative inputs.
4. I can simplify linear algebraic expressions by collecting like terms.
5. I can simplify linear algebraic expressions by multiplying a single term over a bracket.
6. I can substitute directed numbers in linear expressions.
7. I can change the subject of a formula that uses one or two operations.
8. I am able to write down and solve an equation using balancing scales involving unknown and whole numbers on both sides.
9. I can use and solve simple linear equations involving brackets *e.g. Solve for* x $(x – 1) = 2x + 6$
10. I can work through situations leading to solution of linear equations in one unknown.
11. I can plot points and read coordinates from a grid in all four quadrants.
     READING AND UNDERSTANDING
12. I can write the coordinates of a set of points for equations *such as* $y = 3x$, $y = −4$ *or* $y = 3x + 4$.
     WRITING
13. I can construct tables of values for linear functions.
14. I can plot the graph of a linear function from a table of values.
15. I can understand what the gradient of a line represents.
16. I can understand what the y-intercept and the x-intercept represent.
17. I can understand that for the equation $y = mx + c$ the value of m determines the gradient of the graph and the value of c the y-intercept.
18. I can write the equation of a straight line given the gradient and the y-intercept.
19. I can use straight line graphs to find the value of one coordinate given the other.
20. I can interpret straight line graphs.
21. I can compare and contrast information from two or more straight line graphs concerning real life situations.
22. I can work out the input/output of number or function machines inspired by real examples such as equations involving degrees Celsius and Fahrenheit.
     LEARNING TO DO

Subject Focus: Algebra – Fundamentals of Algebra (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources *e.g. algebra blocks* appropriate to this level to learn about the fundamentals of algebra.

Subject Focus: Shape, space and measures – Measures (Angles)

1. I can show and label the sixteen compass points.
    COGNITIVE LEARNING
2. I can estimate, sort, measure and draw angles up to and including 360° with a protractor allowing for a margin of error: +/- 2°.
    COGNITIVE
3. I can identify and distinguish between right, acute, obtuse and reflex angles.

Subject Focus: Shape, space and measures – Measures (Length, Area, Volume, Mass & Capacity)

1. I can understand that the volume of a solid shape is a measure of the amount of material that makes up that shape.
2. I can read and write the vocabulary related to volume.
   WRITING
3. I can estimate measure and compare volumes.
   COGNITIVE LEARNING
4. I can use the decimal notation to express measures of volume.
5. I can convert and use larger to smaller standard metric units of area *i.e* km^2, m^2, cm^2, mm^2; and *volume i.e* m^3, cm^3, mm^3, *and vice versa.*
6. I can work out the areas of irregular and regular shapes by counting squares on a grid.
   COGNITIVE LEARNING
7. I can derive and use formulae to find the area of a parrellelogram, a triangle, and a trapezium.
8. I can calculate the area of compound shapes that include right angled triangles, parallelograms and trapezia.
9. I can understand that the surface area of a solid shape is the total amount of surface of the shape.
10. I can calculate the surface area and volume of cubes and cuboids.
11. I can understand that the prism is a solid with a uniform cross-section and can find its volume using V = area of cross-section x length.

Subject Focus: Shape, space and measures – Measures (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources *e.g. plastic money, cardboard clocks, 2D and 3D plastic shapes, measuring instruments* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Euclidean geometry (Lines & Lines Segments)

1. I can recognise and draw examples of parallel lines and transversals.
2. I know that parallel lines have equal gradients.
3. I can recognise alternate angles, corresponding angles and interior angles within sets of parallel lines and transversals.

Subject Focus: Shape, space and measures – Euclidean geometry (Angles)

1. I can work out the size of missing angles in situations involving vertical opposite angles and parallel lines cut by transversals.

Subject Focus: Shape, space and measures – Euclidean geometry (Triangles)

1. I can follow a proof that the angle sum of a triangle is 180˚.
2. I can understand, know, can apply and can follow a proof that the exterior angle of a triangle is equal to the sum of the interior angles at the other two vertices.
3. I can use the properties of triangles i.e equilateral, isosceles, scalene and right-angled triangle, in order to solve problems involving missing angles.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Quadrilaterals)

1. I can classify quadrilaterals according to the length of their sides and the size of their angles i.e square, rectangle, rhombus, parallelogram, trapezium and kite.
    COGNITIVE LEARNING
2. I can understand that the sum of the angles of a quadrilateral is 360°. I can also work out the size of missing angles in quadrilaterals.
    COGNITIVE LEARNING
3. I can use the properties of quadrilaterals i.e square, rectangle, rhombus, parallelogram, trapezium and kite in order to solve problems involving missing angles.
    COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (3D Shapes)

1. I can identify and count faces, vertices and edges of compound 3D shapes.
2. I can identify possible and impossible nets for a cuboid, a triangular prism, and a square-based pyramid.
    COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Circles)

1. I can identify the centre, radius, diameter and circumference of a circle.

Subject Focus: Shape, space and measures – Euclidean geometry (Constructions)

1. I can construct 60° and 90° angles using a straight edge and compasses, and, using a dynamic geometry software package.
2. I can construct triangles using ruler and compasses and a dynamic geometry software package.
3. I can construct regular hexagons using ruler and compasses.

Subject Focus: Shape, space and measures – Euclidean geometry (Coordinate Geometry)

1. I can use positive and negative coordinates to plot points and draw shapes.
2. I can find the coordinates of a missing vertex of a shape.

Subject Focus: Shape, space and measures – Euclidean geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Transformation geometry (Reflections)

1. I can identify and draw lines of symmetry in polygons.
2. I can classify quadrilaterals using reflective symmetry.
3. I can draw and describe reflections.
    MANAGING LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Rotations)

1. I can identify the rotational symmetries of a regular polygon.
2. I can identify shapes having rotational symmetry and find their order of symmetry.
3. I can draw and describe rotations.
    MANAGING LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Translations)

1. I can draw and describe translations.
    MANAGING LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Enlargements)

1. I can draw and describe enlargements.
   MANAGING LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about transformation geometry.

Subject Focus: Data handling and chance – Statistics

1. I understand the meaning of discrete data.
2. I can construct a frequency table with grouped or ungrouped discrete data.
   PRACTICAL
3. I can construct a bar chart and a bar-line graph using grouped or ungrouped discrete data from a frequency table.
   PRACTICAL
4. I can work through a situation by representing, extracting and interpreting data in tables, graphs, charts and diagrams, including those generated by assistive technology.
5. I can interpret pie charts.
6. I can construct pie charts.
7. I can construct a Carroll diagram.
8. I understand what the median, mode and range of a set of data respresent.
9. I can find the median of a set of data.
10. I can find the mode of a set of data.
11. I can find the range of a set of data.

Subject Focus: Data handling and chance – Statistics (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about statistics.

Subject Focus: Data handling & chance – Probability

1. I can mention events that are certain to happen, and others that will not.
   COGNITIVE
2. I can describe events as certain, impossible, likely or unlikely.
   COGNITIVE
3. I can estimate a probability by experiment.
   LEARNING TO DO
4. I can understand the difference between experimental and theoretical probability.
5. I can understand that the probability of a certain event is 1 and the probability of an impossible event is 0.
6. I can mark the probability on a probability scale.
7. I can identify the set of all possible outcomes or possibility space of an experiment.
8. I can understand that the probability of all mutually exclusive outcomes of an experiment adds up to 1.
9. I can construct a possibility space and use it to work the probability of an outcome.
   COGNITIVE LEARNING
10. I can mark the probability on a probability scale.

Subject Focus: Data handling & chance – Probability (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about probability.

LEVEL 8

Subject Focus: Number - The number system

1. I am able to use the number line to illustrate simple inequalities.
2. I can compare and order numbers up to one billion and include symbols such as <, > or =.
3. I can understand how to write multiples of numbers using power notation.
4. I can identify all the common factors of two numbers.
5. I can identify the highest common factor (HCF) of two numbers.
6. I can understand and can use prime factorization.
7. I can understand the place value of any digit behind the decimal point in a decimal number up to one millionth.
8. I can state one number lying between any two given numbers.
9. I can understand how to write numbers in standard form and vice-versa.
   WRITING
10. I can find the reciprocal of a number.

Subject Focus: Number - The number system (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about numbers and their properties.

Subject Focus: Number - Numerical calculations (Whole Numbers, Decimal Numbers & Fraction Numbers - The Four Operations)

1. I can round any whole number to the nearest ten, hundred, thousand, ten thousand, hundred thousand and million.
2. I can use rounded numbers to make rough approximations.
   COGNITIVE LEARNING
3. I can work out mental calculations involving powers and roots, *e.g. √1600, 90^2, 20^3, $\sqrt[3]{8000}$.*
   COGNITIVE LEARNING
4. I can round any decimal number to a given number of decimal places.
5. I can round any decimal number to a given number of significant figures.
6. I can find fractions of a number using assistive technology.

Subject Focus: Number - Numerical calculations (Percentages)

1. I can work through simple situations involving percentage increase and decrease using a number of methods including the multiplying factor.
2. I can work out reverse percentage calculations.
   COGNITIVE LEARNING
3. I can work trough situations involving successive percentage changes using a multiplying factor.
4. I can work out the simple interest, the principal, the rate, time or the amount.
5. I can use the simple interest formula.
6. I can work out compound interest, appreciation and depreciation.
7. I can use the appreciation and depreciation formulae.
8. I can use the trial and error method to determine the number of years in compound growth and decay situations.
9. I can work out the number of repayments needed to repay a loan.
10. I can work out the total accrued yearly value of an investment.

Subject Focus: Number - Numerical calculations (Money & Consumer Mathematics)

1. I can recognise the difference between selling rate and buying rate in currency exchange rates. I can use buying rate and selling rate to convert currencies.
2. I can work out totals of up to one million euro and give the correct change.
3. I can work through complex situations involving personal and household finance *e.g. earnings, loans, simple interest, compound interest, income tax, VAT and insurance*.

Subject Focus: Number - Numerical calculations (Ratio & Proportion)

1. I can use ratio to solve complex problems.
2. I can draw and interpret simple scale drawings.
   WRITTING
3. I can work through situations that involve direct proportion with and without the use of the unitary method.
4. I can use the rules for multiplying and dividing integer powers of numbers in positive, negative and zero indices *e.g.* $7^8 \times 7^{-5} = 7^3$, $(2^3)^5 = 2^{15}$

Subject Focus: Number - Numerical calculations (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources appropriate to this level to calculate and to learn about numerical calculations.

Subject Focus: Algebra – Fundamentals of Algebra

1. I can generate the terms of a sequence given the *nth* term.
2. I can use expressions to describe the n^{th} term of a linear sequence *e.g. -3n - 1*
3. I can use letters to represent two or more unknown values in expressions involving +, −, x, ÷ and squares.
4. I can simplify non-linear algebraic expressions by collecting like terms.
5. I can simplify non-linear algebraic expressions by multiplying a single term over a bracket.
6. I can expand two brackets of the form $(x \pm a)(x \pm b)$ and $(x \pm a)2$ and can simplify by collecting like terms.
7. I can simplify any algebraic expression by expanding brackets and collecting like terms.
8. I can add, subtract and simplify algebraic fractions with numerical denominators.
9. I can simplify algebraic fractions with linear algebraic denominators *e.g. Simplify* $4 / (2x + 4)$
10. I can substitute directed numbers in non-linear expressions.
11. I can change the subject of the formula that includes squares and square roots and when the same letter occurs more than once.
12. I am able to write down and solve an equation involving an unknown and integers or fractions on both sides.
    COGNITIVE LEARNING
13. I can solve simple linear inequalities in one variable and represent the solution on the number line.
14. I can factorise expressions by using the common factor method.
15. I can factorise quadratic expressions including the difference of two squares method.
16. I can factorise trinomials.
17. I can solve algebraically two simultaneous linear equations.
18. I can solve quadratic equations by factorisation.
19. I can solve quadratic equations by using the formula.
20. I can solve equations involving algebraic fractions with linear denominators.
21. I can find approximate solutions to equations for which there is not a simple method of solution using the trial and improvement method *e.g. Solve for* x $x^3 - 2x = 100$
    MANAGING LEARNING
22. I can construct tables of values for quadratic functions.
23. I can plot the graph of a quadratic function from a table of values.
24. I can find the gradient of a line from the coordinates of two points on the line.
25. I can write the equation of a straight line given a set of co-ordinates or the line graph.
    MANAGING LEARNING

26. I can solve graphically two simultneous linear equations.
27. I can solve graphically two simultaneous equations: one linear and one quadratic.
28. I can draw quadratic graphs and identify maxima/minima.
    MANAGING LEARNING
29. I can use quadratic graphs to find the value of a coordinate given the other.
30. I can use quadratic graphs to solve quadratic equations.
31. I can draw and interpret linear and non-linear graphs arising from real life situations.
32. I can work through situations involving direct and inverse proportion to determine unknown quantities.

Subject Focus: Algebra – Fundamentals of Algebra (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources *e.g. algebra blocks* appropriate to this level to learn about the fundamentals of algebra.

Subject Focus: Shape, space and measures – Measures (Angles)

1. I can interpret and use three-figure bearings.
2. I can define the trigonometric ratios *i.e sine, cosine and tangent*, as the ratios of sides in a right angled triangle.
3. I can use the triogonometric ratios to find unknown lengths and angles in right-angled triangles.
4. I can use the triogonometric ratios in situations that involve angles of elevation and/or depression.
5. I am able to find missing angles in diagrams by forming and solving algebraic equations.
6. I can use the sine and cosine rules to solve any triangle.

Subject Focus: Shape, space and measures – Measures (Length, Area, Volume, Mass & Capacity)

1. I am able to use more than one conversion of standard metric units in a simple situation.
2. I can find the area of acute and obtuse angled triangles using ½ absinC.
3. I can understand the notion of pi as a ratio of circumference to diameter.
4. I can use formulae to find the area and circumference of circles.
5. I can calculate the area of sectors of a circle.
6. I can calculate the area of compound shapes that use sectors of circles.
7. I can express the length of an arc and the area of a sector as fractions of a circle.
8. I can derive and use the formula for the surface area and volume of a prism or cylinder.
   COGNITIVE
9. I can calculate the surface area and volume of a pyramid, a frustum of a pyramid, a right circular cone, a frustum of a right circular cone, and a sphere.
10. I can rearrange formulae for surface area/volume of solids to find the radius, height and slant height.

Subject Focus: Shape, space and measures – Measures (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources *e.g. 2D and 3D plastic shapes measuring instruments* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Euclidean geometry (Lines & Lines Segments)

1. I can distinguish between lines and line segments.

Subject Focus: Shape, space and measures – Euclidean geometry (Triangles)

1. I can understand and can use Pythagoras' Theorem in 2D shapes.
   COGNITIVE LEARNING
2. I can understand and can use the Converse of Pythagoras' Theorem in 2D shapes.
3. I can understand that a triangle whose sides are in the ratio of 3:4:5 or in the ratio of 5:12:13 is a right angled triangle.

Subject Focus: Shape, space and measures – Euclidean geometry (Quadrilaterals)

1. I can follow a proof that the angle sum of a quadrilateral is 360˚.

Subject Focus: Shape, space and measures – Euclidean geometry (Polygons)

1. I can describe the properties of regular polygons related to sides, angles and diagonals, and can describe their symmetrical properties.
   READING AND UNDERSTANDING
2. I can calculate and use the sums of the interior and exterior angles of regular and irregular polygons.

Subject Focus: Shape, space and measures – Euclidean geometry (3D Shapes)

1. I can draw different views of a given simple 3D shape.

Subject Focus: Shape, space and measures – Euclidean geometry (Circles)

1. I can identify chord, a tangent, an arc, a sector and a segment of a circle.
2. I can understand, know, and can apply the circle theorems. I can also follow a proof for each circle theorem. The circle theorems are:
   - The angle in a semicircle is a right angle.
   - The angle which an arc of circle subtends at the centre is twice that which it subtends at any other point on the remaining part of the circumference.
   - Angles in the same segment of a circle are equal.
   - The opposite angles of a cyclic quadrilateral are supplementary. Angles in opposite segments are supplementary.
   - Exterior angle of cyclic quad is equal to the interior opposite angle.
   - The angle between the radius and the tangent at the point of contact is a right angle.
   - Equal chords are equidistant from the centre.
   - Chords which are equidistant from the centre of a circle are equal.
   - The perpendicular bisector of a chord passes through the centre.
   - A straight line drawn from the centre of a circle to bisect a chord which is not a diameter is at right angles to the chord.
   - If two tangents are drawn to a circle from a point outside the circle, then
     (i) the tangents are equal in length;
     (ii) the angle between the tangents is bisected by the line joining the point of intersection of the tangents to the centre; and,
     (iii) this line also bisects the angle between the radii drawn to the points of contact.
   - If a straight line touches a circle, and from the point of contact a chord be drawn, the angles which the chord makes with the tangent are equal to the angles in the alternate segments.

Subject Focus: Shape, space and measures – Euclidean geometry (Constructions)

1. I can construct the perpendicular bisector of a line segment, the perpendicular from a point to a line, and, the angle bisector of a pair of intersecting lines using a straight edge and compasses, and using a dynamic geometry software package.
2. I can construct triangles given various conditions using a ruler and compasses and dynamic geometry software.
3. I can construct regular hexagons using dynamic geometry software such as Cabri-Geometre and a suitable programming environment such as Logo.

Subject Focus: Shape, space and measures – Euclidean geometry (Congruency & Similarity)

1. I can understand the concept of congruency. I can identify congruent shapes.
2. I can prove two triangles are congruent using SSS, SAS, ASA and RHS.
   COGNITIVE LEARNING
3. I can use the fact that two triangles are congruent in order to find the lengths of missing sides.

Subject Focus: Shape, space and measures – Euclidean geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Transformation geometry (Reflections)

1. I understand that reflections preserve length and angle.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Rotations)

1. I can find the centre of rotation by inspection and/or by construction.
   COGNITIVE
2. I understand that rotations preserve length and angle.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Translations)

1. I can create tessellating shapes and draw a tessellation.

Subject Focus: Shape, space and measures – Transformation geometry (Enlargements)

1. I can enlarge a shape given the centre of enlargement using positive and negative scale factors both whole and fractional, of enlargements.
2. I can understand that enlargements preserve angle but not length.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Combining Transformations)

1. I can transform 2D shapes by a combination of transformations.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Transformation geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about transformation geometry.

Subject Focus: Data handling and chance – Statistics

1. I understand the meaning of continuous data and can explain the difference between discrete and continuous data.
2. I can construct a frequency table using grouped and ungrouped continuous data.
   PRACTICAL
3. I can interpret a histogram with equal intervals.
4. I can construct a histogram with equal intervals.
5. I can find the median of a set of data from a frequency table.
6. I can find the mode of a set of data from a frequency table.
7. I can find the range of a set of data from a frequency table.

Subject Focus: Data handling and chance – Statistics (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about statistics.

Subject Focus: Data handling & chance – Probability

1. I can work out the probability of mutually exclusive events.
2. I know the difference between dependent and independent events.
3. I can work out the probability of independent and dependent events.
4. I can work out the combined probability of two independent events.
5. I can construct and use a probability tree or tree diagram to work out the probability of independent and dependent events.

Subject Focus: Data handling & chance – Probability (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about probability.

LEVEL 9

Subject Focus: Number - The number system

1. I can identify all the common factors of three numbers.
2. I can identify the highest common factor (HCF) of three numbers.
3. I can understand and use prime factorization to work out the square root of large numbers and to work out the LCM and HCF.
4. I can understand that 0.999... represents 1.
5. I can understand that the reciprocal of a number is its multiplicative inverse.

Subject Focus: Number - The number system (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about numbers and their properties.

Subject Focus: Number - Numerical calculations (Ratio & Proportion)

1. I can use scale drawings to find actual distances and areas.
2. I can use ideas of direct and inverse proportion in situations inspired by real life examples.
3. I can use index notation and the rules for working with positive and negative fractional powers.

Subject Focus: Number - Numerical calculations (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources appropriate to this level to calculate and to learn about numerical calculations.

Subject Focus: Algebra – Fundamentals of Algebra

1. I can use expressions to describe the n^{th} term of a quadratic sequence *e.g.* $2n^2 - n + 1$
2. I can add and subtract algebraic fractions with linear and quadratic algebraic denominators.
3. I can solve algebraically two simultaneous equations, one linear and one quadratic.
4. I can solve equations involving algebraic fractions with quadratic denominators.
5. I can solve equations using indices when x is a power.
6. I can construct tables of values for cubic functions and reciprocal functions.
7. I can plot the graph of a cubic function and a reciprocal function from a table of values.
8. I can solve graphically two simultaneous equations: one linear and one cubic; or, one linear and one reciprocal.
9. I can understand and can use function and inverse function notation.
10. I can work through situations that use direct and inverse variation (y α xn for n = ±1, ±2, ±3, ±1/2, ±1/3), *e.g. speed distance and time*.
    LEARNING TO DO
11. I can interpret and understand rates of change in linear and non-linear graphs.

Subject Focus: Algebra – Fundamentals of Algebra (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calcultors* and other resources *e.g. algebra blocks* appropriate to this level to learn about the fundamentals of algebra.

Subject Focus: Shape, space and measures – Measures (Angles)

1. I can use the trigonometric ratios to work through situations involving angles and bearings in 3D.

Subject Focus: Shape, space and measures – Measures (Length, Area, Volume, Mass & Capacity)

1. I can calculate the area of compound shapes that include triangles
2. I can calculate the area of segments of a circle.
3. I can calculate the area of compound shapes that use segments of circles.
4. I can understand and use the relationship between length, area and volume of similar shapes.
5. I can give appropiate upper and lower bounds for measurement data given to a specifield accuracy *e.g. measured lengths, measured weights*.
6. I can obtain appropriate upper and lower bounds to solutions of simple calculations.

Subject Focus: Shape, space and measures – Measures (Assistive Technology & Other Resources)

1. I can use assisitive technology *e.g. tablets, computers and calculators* and other resources *e.g. 2D and 3D plastic shapes, measuring instruments* appropriate to this level to to learn about measures.

Subject Focus: Shape, space and measures – Euclidean geometry (Triangles)

1. I can use Pythagoras' Theorem in 3D shapes.

Subject Focus: Shape, space and measures – Euclidean geometry (3D Shapes)

1. I can draw the net of a cube, a cuboid, a triangular prism and a square-based right pyramid.

Subject Focus: Shape, space and measures – Euclidean geometry (Congruency & Similarity)

1. I understand the concept of similarity. I can identify similar shapes.
2. I can prove two triangles are similar using either one of the following properties: (i) the angles of one are respectively equal to the angles of the other (AAA); (ii) the ratio of any pair of sides of the first triangle is equal to the ratio of the corresponding sides of the other; (iii) one angle of one triangle is equal to one angle of the other triangle and the sides about these equal angles are proportional.
   COGNITIVE LEARNING
3. I can use the fact that two triangles are similar in order to find the lengths of missing sides.

Subject Focus: Shape, space and measures – Euclidean geometry (Loci)

1. I can understand what a locus of a point is.
2. I can construct the locus of a point using a variety of methods including ruler and compasses and assistive technology.
   COGNITIVE LEARNING

Subject Focus: Shape, space and measures – Euclidean geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Transformation geometry (Reflections)

1. I can identify planes of symmetry.

Subject Focus: Shape, space and measures – Transformation geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about transformation geometry.

Subject Focus: Data handling and chance – Statistics

1. I can read and interpret a cumulative frequency table and a cumulative frequency graph.
2. I can construct a cumulative frequency table and use it to draw a cumulative frequency graph.
3. I can interpret a histogram with unequal intervals.
4. I can construct a histogram with unequal class intervals.
    PRACTICAL
5. I understand what the modal class, quartiles and the inter-quartile range of a set of data respresent.
6. I can find the class interval in which the median of a set of data lies from a frequency table.
7. I can identify the modal class for a set of data from a frequency table.
8. I can find the range of a set of data from a grouped frequency table.
9. I can use cumulative frequency graphs to estimate the median, the quartiles and the inter-quartile range.
    COGNITIVE LEARNING
10. I can interpret box-and-whisker plots.
     COGNITIVE LEARNING
11. I can construct box-and-whisker plots.
     PRACTICAL

Subject Focus: Data handling and chance – Statistics (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about statistics.

Subject Focus: Data handling & chance – Probability (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about probability.

LEVEL 10

Subject Focus: Number - The number system (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resouces to learn about numbers and their properties.

Subject Focus: Number - Numerical calculations (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources appropriate to this level to calculate and to learn about numerical calculations.

Subject Focus: Algebra – Fundamentals of Algebra

1. I can understand arithmetic progresssions and find the sum of the first *n* terms of an arithmetic progression.
2. I can understand geometric progressions and can find the sum of the first *n* term of a geometric progression.
3. I can solve quadratic equations by completing the square.
4. I can work out indices applied on algebraic expressions and not just on arithmetic values.
5. I can understand that a logarithm is an index and understand simple logarithmic results *such as log ab = log a + log b*.
6. I can use the Remainder/Factor Theorem including factorization of cubic functions by means of the grouping method.
7. I can identify and work out different forms of partial fractions.
8. I can identify surds and can also rationalise the denominator.
9. I can find the derivative of y = axn .
10. I can understand the relationship between the equation y = f(x) and its graph and be able to identify what role the variables x and y have in such equations.
11. I can find the solution to an inequality or set of inequalities on a graph by shading the appropriate regions.
12. I can plot graphs of trigonometric functions and understand their use in solving simple trignometric equations in conjunction with the CAST rule.
13. I can use curve sketches to identify graphs and sketch curves by determining values of x and y at the points of intersection with the axes.

Subject Focus: Algebra – Fundamentals of Algebra (Assistive Technology & Other Resources)

1. I can use assisitive technology *e.g. tablets, computers and calculators* and other resources *e.g. algebra blocks* appropriate to this level to learn about the fundamentals of algebra.

Subject Focus: Shape, space and measures – Measures (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other resources *e.g. 2D and 3D plastic shapes, measuring instruments* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Euclidean geometry (Circles)

1. I can prove the circle theorems.

Subject Focus: Shape, space and measures – Euclidean geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about measures.

Subject Focus: Shape, space and measures – Transformation geometry (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets and computers* and other resources *e.g. 2D and 3D plastic shapes* appropriate to this level to learn about transformation geometry.

Subject Focus: Data handling and chance – Statistics

1. I understand what the standard deviation of a set of data represents.
2. I can find the standard deviation of a set of data.

Subject Focus: Data handling and chance – Statistics (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about statistics.

Subject Focus: Data handling & chance – Probability

1. I can understand set notation and can use it to denote the possibility space of an experiment.

Subject Focus: Data handling & chance – Probability (Assistive Technology & Other Resources)

1. I can use assistive technology *e.g. tablets, computers and calculators* and other learning resources to learn about probability.

Pedagogy

A. PEDAGOGY AND GOOD PRACTICE LEARNING

The dual nature of mathematics – mathematics as a body of knowledge (a product) and mathematics as a mode of enquiry (a process) – makes it imperative that educators use a variety of teaching approaches in order to cater for both these aspects. Effective teachers of Mathematics recognise that there is no single best way to teach Mathematics and adopt those teaching approaches which will help their learners to learn the subject and to appreciate its different facets.

Irrespective of the approach used, the learner should remain at the centre of the learning experience. Ultimately, it is what learners learn that is important. All learners are entitled to a quality education based on an active learning approach that encourages them to maximise their achievements according to their abilities. Thus, it is important that educators set activities which encourage active doing: understanding, thinking, solving, investigating, discovering, asking, hypothesising, reasoning, justifying, proving, evaluating, calculating, representing, checking, choosing, comparing, contrasting, connecting, measuring, approximating, estimating and communicating (Directorate for Quality and Standards in Education – Curriculum Management and eLearning Department, 2014).

Success in mathematics is important for individuals. It increases post-secondary and tertiary education options and boosts prospects for future income. Mathematics opens doors and creates opportunities. Success in mathematics is also important for society. The national workforce of tomorrow will inevitably have to deal with mathematical concepts more fully and more proficiently than the workforce of today. Therefore, the effective teaching of mathematics is in the national interest.

Given that success in mathematics can have a crucial effect on the life chances of future generations it is imperative that all learners should be provided with the opportunities to further their learning of mathematics.

Learners will be best served if during the course of the scholastic year educators make use of the following three teaching approaches:

i) Teaching through exposition

This approach normally involves the teacher in stating the objectives of the lesson. This is then followed by an explanation during which the teacher introduces the new knowledge. This new learning is consolidated by setting learners a number of tasks aimed at helping learners consolidating and practising their newly learnt knowledge. The underlying psychology of learning is a behaviourist one. This approach helps learners learn new facts (e.g. terms, notation and conventions) and skills (e.g. practical measurement skills, calculator skills, computer skills and communication skills). It is also helpful in introducing new concepts and in linking these concepts within conceptual structures and in presenting strategies (e.g. problem-solving, investigating, estimating, approximating, reasoning, and proving and disproving).

ii) Teaching through discovery
This approach requires the teacher to set learners tasks in which they have to discover some new mathematical knowledge. In these tasks learners collect, process and analyse data in order to obtain information, or examine a number of particular examples in order to identify common properties. In these tasks learners are also encouraged to make and test relevant hypotheses and/or make generalisations. The underlying psychology of learning is a constructivist one. This approach is suitable for facilitating learners' further development of concepts and conceptual structures; facts (e.g. terms, notation and conventions), skills (e.g. practical measurement skills, calculator skills, computer skills and communication skills) and strategies (e.g. problem-solving, investigating, estimating, approximating, reasoning, and proving and disproving) as well as in improving learners' personal qualities (e.g. being imaginative, creative, flexible, persistent, systematic, independent; cooperative) and their attitudes towards mathematics (e.g. interest, motivation, pleasure and enjoyment).

iii) Teaching through exploration
This approach usually consists of the teacher setting learners tasks in which learners have to test a hypothesis based on their understanding of a concept. These tasks might be open or closed problems or might include investigations. In these tasks learners have to collect further data and process it in order to obtain further information required to complete their tasks. The underlying psychology of learning is a constructivist one. This approach is appropriate for facilitating learners' use of facts (e.g. terms, notation and conventions), skills (e.g. practical measurement skills, calculator skills, computer skills and communication skills), concepts and strategies (e.g. problem-solving, investigating, estimating, approximating, reasoning, and proving and disproving). It can also have a beneficial effect on learners' personal qualities and their attitudes towards mathematics (e.g. interest, motivation, pleasure and enjoyment).'

Directorate for Quality and Standards in Education – Curriculum Management and eLearning Department (2012 : 9-10)

Everyone can learn mathematics – it is not simply a matter of innate ability but of continuous effort. Although not every learner will learn mathematics with the same sort of ease and at the same pace, educators can greatly help their learners' efforts to learn mathematics if they structure their teaching to focus on three key elements: ***automatic recall of facts***, ***procedural fluency*** and ***conceptual understanding*** (National Research Council, 2001; National Mathematics Advisory Panel, 2008). All three of these elements are needed for the successful learning of mathematics. Factual knowledge of basic mathematical facts (e.g. multiplication facts) is needed because rapid and relatively attention free recall of these facts is crucial when solving complex mathematical problems. The ability to perform a small set of algorithms is also critical in problem solving because complex mathematical problems can, more often than not, be broken down into simpler mathematical problems that require the correct performance of some frequently encountered routine mathematical procedure (e.g. algorithm to multiply two 2-digit numbers; algorithm to multiply two trinomials; algorithm to solve a quadratic equation). Conceptual knowledge is also required when solving complex mathematical problems as understanding is at the very core of problem solving. Unless learners understand what they are doing it is highly unlikely that they will be able to make sense of the problem and what is required to solve it. Moreover, the correct interpretation of a solution requires understanding of meaning: knowing why and not simply knowing that or knowing how (e.g. why a negative answer might be meaningless as a solution to a given problem).

Whatever teaching approach is adopted at any point in time it should aim to help learners develop:
- a deep understanding of mathematics that is based on knowledge of facts, procedures and meaning.
- the ability to use and apply their mathematical knowledge and understanding to solve a wide range of standard and non-standard problems ideally related to real life situations.
- an understanding and appreciation of the role and purpose of mathematics in our culture and society through appropriate references to the history of the subject.

- the ability to think and communicate mathematically – precisely, logically, creatively and effectively.
- a positive attitude towards mathematics that fosters creativity, confidence, perseverance and enjoyment of the subject.
- the ability to work both independently, collaboratively and cooperatively when doing Mathematics.
- a secure foundation for the further study of mathematics.
- an appreciation of the interdependence of the different strands and topics of mathematics.
- an appreciation of the interdisciplinary nature of mathematics and its use in other areas of knowledge.
- the ability to make efficient, creative and effective use of appropriate technology in mathematics.

(Directorate for Quality and Standards in Education – Curriculum Management and eLearning Department, 2012)

Finally, given that setting by ability is likely to continue in state sector secondary schools for certain subjects, including Mathematics, it is important that teachers tap into ideas on how to create suitable flexible learning experiences to teach the same material to learners with diverse learning styles, competences and different rates of progression.

Learning to Learn Strategies

The following are examples of the strategies which form part of the 'learning to learn process', one of the eight competencies featured in the document *European Reference Framework Key Competencies for Lifelong Learning* (European Commission, 2007):

- Pedagogical discussions between learners where, on a voluntary basis, learners explain how they carried out a specific task and how they managed to overcome the difficulties encountered, resulting in an exchange of strategies and techniques in a cooperative environment.
- Teaching learners to make use of punctuation marks, pictures, additional information outside the text, such as accompanying explanation of difficult keywords and identification of keywords during reading/ comprehension tasks.
- Teaching and guiding on the different stages of essay writing and the different tools and methods which could be adopted during each stage.

The Subject Learning Outcomes (SLOs) have been written in a way which helps educators to adopt engaging, enterprising and active learning approaches in a variety of contexts to promote and enable learner-centric teaching and learning strategies. Curriculum planners at all stages should regularly consider the opportunities presented by the SLOs to develop active learning throughout the levels in the Learning Outcomes Framework. Planning should be responsive to, as well as encourage participation by, the learner who can and should influence and contribute to the process.

To support curriculum planning and to ensure that all learners have access to an active, enterprising learning environment, a coherent approach to planning learning, teaching and assessment and to sharing information about progress and achievements is needed. In undertaking this type of curriculum planning, it is important not to see the SLOs as limiting factors containing the learning potential of learners and preventing any deviation of learning beyond that contained within the SLOs. This view fails to take into account the scope and flexibility provided by the learning outcomes approach. How, where and when the outcomes are taught and learned is at the discretion of the educator. The SLOs are there to demystify the assessment process by setting out straightforward learning expectations. In doing so, assessment is bound to evidencing the meeting of these same expectations.

Once the learning expectations are set educators can begin to introduce the flexibility in curriculum design and delivery that has been difficult to do up to this point. The learning outcomes approach allows educators to lean towards learner-centric teaching and learning strategies. This will mean knowing the many ways in which learners are different from one another, which of the many ways of learning are significant to the learning at hand and how to deal with this variance in ways that are supportive of the individual learners and allow them to progress. Section C: Reaching different learners within each level offers guidance on how this can be done.

B. EMBEDDING THE DELIVERY OF THE CROSS CURRICULAR THEMES

Across Europe there has been a shift from an exclusively subject-based approach to a more cross curricular, thematic, inter-disciplinary and collaborative approach that reflects real life situations and encourages transfer of skills from one learning area to another. Through a cross curricular approach, many curricular areas have been given a higher profile and a number of transversal competences have enhanced their status (European Commission, 2012). The CCTs connect the subjects by highlighting common learning objectives which are also reflected at in the school ethos (Ministry for Education and Employment, 2012: 31, 39).

The Cross Curricular Themes (CCTs) have been introduced in the LOF to ensure that all learners, as they progress through the levels, come into continual contact with the types of knowledge, skills and understanding needed to participate actively, prosper and contribute to Maltese society.

The embedding of the CCTs in the Subject Learning Outcomes offers access to a new learning identity that goes beyond the subject; learners will value the CCT learning when they see that it is an integral part of the Learning Outcomes Framework and that it is vital in helping them become holistic learners.

Each CCT is presented as a set of additional learning outcomes that young people need to encounter and develop a knowledge and understanding of as they progress through the Learning Outcomes Framework.

The Cross Curricular Themes are:

Digital Literacy

Education for Diversity

Education for Entrepreneurship, Creativity and Innovation

Education for Sustainable Development

Learning to Learn and Cooperative Learning

Literacy

The Cross Curricular Themes can be found in the Appendix
and online at http://www.schoolslearningoutcomes.edu.mt/en/category/cross-curricular-themes

The CCTs need to be embedded within the learner's learning journey and experiences, the main point being that the CCT knowledge and understanding needs to be learned, consolidated and secured within a context. The context is important in order to add meaning and purpose and to reinforce the usefulness of the CCT. There is no one effective way of organising the embedded learning of the CCTs. However, directly linking a CCT outcome to an appropriate practical task within an SLO and then ensuring that there is an opportunity for CCT support at the time the practical task is undertaken is a particularly effective way of embedding a CCT.

Embedding is not just about interlinking different curricula. Mapping where the CCT content might fit in with SLOs or Subject Foci is only a starting point. The educator needs to establish how the CCT content adds value to the SLOs being taught and how something greater than just the sum of the different parts can be achieved. In essence, the CCT learning adds value in the establishment of key transferable knowledge, skills and understanding by starting with meaningful 'situated' engagements with the learning.

Embedding as a process

There are three main ways to approach the delivery of the knowledge, skills and understanding addressed in the CCTs in the learning process. These are:

- through delivery of and the learning associated with the SLOs
- by choosing particular teaching methods and strategies over others to deliver the SLOs.
- undertaking specifically constructed cross curricular or whole school activities.

This process implies an important shift in the way teachers approach the teaching of the subject content in the classroom. Integrating the cross curricular learning outcomes in the teaching of separate subjects requires teachers to step outside their traditional boundaries and work in close collaboration with one another to develop their approach to the CCTs and to exchange information about the learning development of specific learners in relation to the CCTs (European Commission, 2012:25).

Delivering CCTs through the SLOs

The first approach to the delivery of CCT content is by integrating the CCT learning with that of particular SLOs. The framework provides guidance on the best opportunities to do this. Where a particular SLO presents a good opportunity to address learning related to a Cross Curricular Theme a CCT icon appears after the SLO. This indicates that the SLO:

- creates a naturally occurring opportunity to begin to look at learning and skills development associated with a particular aspect of a CCT.
- can be enhanced or enriched by introducing a particular aspect of one of the CCTs.

To guide the educator to the specific learning outcomes of the CCT that are most relevant, the CCT icon which is attached to the SLO in question also includes a heading to identify which particular aspect of the CCT is the 'best fit', i.e. the part of the CCT content that is most closely linked to the knowledge, understanding and/or skills addressed within the SLO.

Although only one CCT has been identified this does not necessarily mean that other CCTs are not relevant. The identification of a particular theme merely suggests that the educator may find the one identified to be the most relevant, most appropriate or easiest to embed at that particular point, allowing the educator to teach the subject and the CCT in an integrated way.

Examples of this type of embedding in Mathematics include:

- I can work through an equation where there are pictures instead of numbers.
  COGNITIVE LEARNING
  Taken from Level 6, Subject Focus: Algebra – Fundamentals of Algebra

- I can calculate, compare and discuss special offers
  MANAGING LEARNING
  Taken from Level 6, Subject Focus: Numerical Calculations – Money & Consumer Mathematics

- I can construct a frequency table with grouped or ungrouped discrete data.
  PRACTICAL
  Taken from, Level 7 Subject Focus: Data Handling and Chance – Statistics

Example: Finding opportunities to address CCT learning in Mathematics SLOs

- **I can construct a frequency table using grouped and ungrouped continuous data.**
  PRACTICAL

Taken from Level 8, Subject Focus: Data Handling and Chance – Statistics

The category related to Practical knowledge and skills within the Education for Entrepreneurship, Creativity and Innovation CCT, particularly the following SLOs within that category:

- I can turn creative ideas into action.
- I have a basic set of research skills.

can easily be covered through the Mathematics SLO given above.

Opening up the use of statistics to applied problems that need to be researched means that learners can identify creative ways to collect and present data and at the same time develop a basic set of quantitative, research skills. This may even be extended to using ICT and open source survey tools introducing aspects of digital literacy and allowing a slightly wider sample population to participate in the research activity.

Addressing CCTs through use of particular teaching methods and strategies

CCTs can be used to inform the creation of departmental policies and strategies, for example, by deliberately structuring learning to maximise the use of digital technologies. At the Mathematics Departmental level the following CCTs may be particularly suitable to help inform the pedagogy choices and delivery styles selected to maximise the flexibility introduced by the LOF:

Learning to Learn and Cooperative Learning

Digital Literacy

Education for Diversity

Educators may find that the following CCTs have a role to play in the choice of topics to stimulate interest and debate:

Education for Sustainable Development

Education for Entrepreneurship, Creativity and Innovation.

It will become evident that some of the CCTs are naturally suited to particular learning and teaching styles. Section C *Reaching different learners within each level* provides guidance on how particular CCTs can equip learners to thrive in particular learning environments. Deliberately choosing particular teaching strategies involving active and/or experiential learning and problem solving approaches where a certain degree of learner autonomy as well as team work is required will help frame learning in ways conducive to the introduction of the Digital Literacy and Learning to Learn and Cooperative Learning CCTs.

For example, the Learning to Learn and Cooperative Learning CCT comprises a category of learning outcomes on Personal Learning and, by addressing the learning related to this category of the CCT, learners will be developing the learning skills to bring to any task where a degree of autonomy and self-management is required. Similarly, the Social Learning category within the same CCT can help learners develop a framework of skills, attitudes and behaviours that will help them make the most of group or team work and other social learning strategies.

The Digital Learning CCT will help learners develop the competencies related to managing learning, sourcing, manipulating, communicating and presenting information. Having these types of learning skills embedded in the learning before they are most heavily used or required will help the learner approach the tasks with greater confidence in both the process of learning about SLOs and in demonstrating achievement of the outcomes themselves.

Addressing CCTs through cross curricular or whole-school activities

All the CCTs can be used as whole-school strategies for creating a high quality learning environment that values all learners and sets high expectations for all. Schools may see the benefit in having whole-school policies on the advancement of:

- Literacy
- Digital Literacy
- Education for Diversity
- Education for Sustainable Development

These types of CCTs can be used to help inform whole-school policies as well as add real value to the learning within the classroom. However, other CCTs may be used to form the basis of whole Year Group activities, or wider all-learner school initiatives around environmental issues. For example:

- The Education for Sustainable Development CCT could be used to form the basis of whole-school extra-curricular activities related to the Eko-Skola type of initiatives or low energy use initiatives. Fundraising activities to help with a school pursuit of renewable energy sources might bring together learning from this CCT with that of the Education for Entrepreneurship, Creativity and Innovation CCT.
- The Education for Entrepreneurship, Creativity and Innovation CCT could be used to underpin the learning and experiences associated with activities ranging from a ‘learner-owned’ tuck shop to a school event or whole-school initiatives about the world of work.

C. REACHING DIFFERENT LEARNERS WITHIN EACH LEVEL

One of the benefits of working within a Learning Outcomes Framework (and at the same time one of the challenges) is the ability to allow learners to progress at their own speed and to be able to adapt the teaching methodology and curriculum to meet their learning needs. The SLOs clearly show where the learning 'finish line' is at each level for each learner but educators need to acknowledge and plan for those learners who will reach this point quicker than some and also for those who may need more time and more scaffolding to be able to get to the standard required.

The Subject Foci are not rigid or restrictive and do not have to be delivered in a particular sequence or as discrete content areas taken in isolation. Subject Foci can be overlapped and blended into larger (or smaller) learning programmes. Educators may prefer to approach the learning contexts in a different order depending on the situation, or to deliver aspects of the learning through preferred topics.

Diversity of learners

The NCF embraces diversity and requires that this be promoted through an inclusive environment.

The NCF addresses the needs of:

- gifted and talented learners for whom the process of learning needs to be sufficiently challenging to engage and motivate them to develop their talents.
- learners with special educational needs for whom the curriculum should be written in a way that allows the teachers to appreciate how every student can access the same curriculum in every learning area and allows for the assessment of a continuum of ability.
- learners with severe disabilities for whom the curriculum should offer an education based on a continuum of abilities expressed in terms of developmental phases.
- learners from disadvantaged social backgrounds for whom the school, in collaboration with key local and institutional stakeholders in the community, needs to up-skill and support families and the local community to provide an environment that is educationally rich and stable.
- learners from diverse social, cultural and linguistic backgrounds including children of refugees and asylum seekers for whom the curriculum should include access to an educational programme which is embedded within an emotionally and psychologically supportive environment that respects their individual circumstances.

A National Curriculum Framework for All, Ministry for Education and Employment (2012:41)

The Mathematics examples provided in the SLOs are the suggested level required at that level. They are not restrictive and the teacher will be able to add more stretching mathematics for learners able to cope with the additional challenge.

All classrooms, even where setting is used, will comprise a range of abilities. This is because learners will have different strengths and limitations and will develop at different rates. To define a 'mixed ability' class simply as a group of learners with a range of abilities is overly simplistic. What about the range of learning styles and preferences, interest levels and home backgrounds, which all impact on the learning experience? Each learner will show strengths at different times depending on the topic being studied and the learning style being used. When they are outside their learning comfort zone they will perform less well. It is unrealistic to expect any group of learners, whatever their ability, to progress through a body of work at exactly the same pace. Two thirds of learners in a classroom will be working outside their learning style unless the task is varied.

One of the most effective ways to ensure that different learners are reached within each level and throughout the LOF is to teach learners to think for themselves. Some of the CCTs provide the toolkit of knowledge and skills for learners to be able to become more effective, resilient, resourceful and autonomous learners.

Progression and differentiation in learning

The principles of diversity and inclusion which underpin the NCF imply that at all stages learners of all aptitudes and competences should experience success, challenge, and the necessary support to sustain their effort. They need flexible learning programmes providing diverse learning experiences that cater for a wide spectrum of learners and allow for different rates of progression as children and young people work through their school years. Different approaches are needed to address different learning needs. With the focus increasingly on the learner, and with more mixed-ability classes in schools, differentiated approaches are becoming more important and teachers need to adopt strategies that build on children's and young people's previous learning and help them progress.

A National Curriculum Framework for All, Ministry for Education and Employment (2012:40)

Strategies for teaching a mixed ability class

The teacher in the classroom must start by making a connection with each learner in their classes on a personal level by knowing and using their names and getting to know what interests them. Incorporating areas of interest into the learning can be a good way to engage learners. Similarly, using this type of knowledge when setting homework or individual class work can be a useful motivator and may help keep learners engaged.

Personal Learning:

- I can identify the support and resources I need to learn.
- I am aware of my preferred way to learn and can use this to plan my own learning.
- I manage goals and time efficiently in learning.
- I feel competent in managing my own learning.
- I am open to feedback from others and am able to consider it.
- I reorganise myself by explicitly changing my assumptions over time.
- I am able to follow my own interests as this helps me to reflect on 'who I am'.
- I am pleased when I succeed at difficult tasks.

Taken from the Learning to Learn and Cooperative Learning CCT

Ways to empower learners and make them more able to thrive within the LOF

Create a dynamic learning environment by:

- managing the classroom and creating opportunities for learners to work individually, in pairs and in groups.
- changing the layout of the classroom to match the learning taking place.
- providing a choice of differentiated activities, allowing learners to select their level of engagement and challenge. This will help with the 'ownership' suggestion listed further down.
- using carefully selected and differentiated resource banks.
- presenting different ways to learn the same thing.

Engage learners by:

- creating a sense of learner ownership of the learning process by, for example, allowing learners to choose their own project.
- allowing learners to demonstrate their understanding in different ways, for example through self-selected means, be it a visual representation, an oral presentation or physical demonstration.
- building in the higher order thinking skills using Bloom's taxonomy (at all levels) and working with the SLOs to keep learning tasks interesting, providing useful stretch and challenges as SLOs are given added dimensions or are approached from different directions. This can be done by giving learners problem-solving tasks with the opportunity to transfer and apply their knowledge to a new context.

Turn learners into resilient learners by:

- at an early stage introducing the learners to the key learning strategies encompassed by the Learning to Learn and Cooperative Learning CCT.
- discussing the learning objective in each lesson with learners, making them aware of what they are expected to achieve by the end of the lesson. The SLOs (written in the first person) are directed at the learner.
- making learners aware of different learning styles; teaching learners techniques for learning new content using visual, auditory and kinaesthetic modes of learning and varying teaching strategies to cater for visual, auditory and kinaesthetic learners.
- teaching learners how to be less dependent on the teacher. For example, how do they get themselves 'unstuck' if they are stuck?

Use group work to:

- allow for reinforcement and extension (by using flexible groups).
- encourage learners to engage in Social Learning and to appreciate diverse viewpoints and personalities; build confidence in discussing their views with others; collaborate with other learners as part of their learning; seek out guidance and support from other learners; talk with others about learning; listen to others talk about learning and discuss various subjects and learning strategies with peers (by using mixed ability groups).

An inclusive approach to teaching and curriculum planning needs to be ensured. While the school will want to create an ethos of achievement for all learners, valuing a broad range of talents, abilities and achievements, the teacher will need to work out what that means in their classroom. At a basic level this starts with promoting success and self-esteem by taking action to remove barriers to learning, thus making sure that all learners in all groups thrive in the classroom. Teachers can overtly promote understanding and a positive appreciation of the diversity of individuals in their class and use the Diversity CCT as a catalyst for this approach extending it to include the learner directly.

Values- based education

Education is as much about building character as it is about equipping students with specific skills The way forward for the implementation of the framework is through values-based education. Values-based education refers to any explicit and/or implicit school-based activity which promotes student understanding and knowledge of values and which develops the skills and dispositions of students so they can enact particular values as individuals and as members of the wider community. It ensures that those leaving school should have qualities of self confidence, high self esteem, optimism and commitment to personal fulfilment as a foundation for their potential life roles as family, community and employees. Furthermore they should have the capacity to exercise judgement and responsibility in matters of ethical and social judgements.

Adapted from *Respect for All Framework,* Ministry for Education and Employment (2014:10)

Schools should have a vibrant and progressive culture, promoting well-being and respect, with ambition and achievement for all learners as its focus. This type of approach needs to be taken in each classroom. A great school is a caring school that supports every single person, irrespective of background or learning need. Such schools work in an atmosphere of unconditional positive regard. They work tirelessly to promote healthy and productive attitudes to learning, to life and to work. Developing an ethos of achievement and ambition defines the aspirational nature of successful schools, making the connection between expectation and success - success which covers all aspects of developing skills for life, for work and for learning - a hallmark of excellence.

From the perspective of the classroom, an inclusive approach addresses learners' needs through a variety of approaches including: early intervention strategies and a curriculum and approaches to learning and teaching which are designed to match the needs of all learners. Educators should have high expectations of their learners because they need to be encouraged to have high aspirations and goals for themselves. It is imperative that educators ensure that their learners know where they are in relation to their learning and how they can improve. Learners should be praised regularly, selectively and effectively to keep motivated.

As learners progress within the levels and between levels they should be encouraged to reflect on, take increasing ownership of and assume more responsibility for their own learning. Educators should start to introduce techniques to allow learners to make increasingly greater use of self-assessment to identify their strengths and development needs from the evidence of their efforts and act on feedback given from peers as well as teachers in order to plan their next steps.

While all learners need curricula that develop the learners' problem solving, reasoning, and communication abilities, the mathematically talented and gifted need in-depth and expanded curricula that emphasise higher order thinking skills, non-traditional topics, and the application of skills and concepts in a variety of contexts (National Council of Teachers of Mathematics, 1993). Consequently, while no one programme will ever serve all learners or work in all settings, gifted learners, because of their special abilities, have needs that demand special programmes in which the curriculum, the teaching methods and the learning environment have been appropriately modified.

Greater curricular modification can be achieved when learners are placed in classes according to ability levels. For learners in the high achievement sets content can then be covered more rapidly, more broadly, or with greater degrees of abstraction, formalism, and rigour. Setting will allow teachers to introduce new topics when learners have mastered the required prerequisite knowledge. It will also allow teachers to present challenging problems according to learners' interests and abilities.

Approaches and strategies for the teaching of gifted learners should include those that should be used with learners of all abilities but carefully adjusted to cater for the higher abilities and greater intrinsic motivation of the more gifted learners. Such approaches and strategies include (see Westberg and Archambault, 1997; House, 1983; Sheffield, 1994):

- high standards and expectations. Learners should be expected to go beyond previous levels with each new task. They should make connections to mathematics they already know; to other subjects; and to everyday life. They should also be encouraged to use elegant, precise, accurate language to describe their thinking and their results. They should be challenged to extend and generalise new learning whenever possible.
- integrating topics from the different strands – Number; Algebra; Shape, Space and Measures; Data Handling and Chance. Topics should not be studied in isolation but in a holistic manner.
- building on what learners already know without excessive repetitions.
- promoting a variety of thinking and reasoning skills.
- using a problem solving approach that encourages learners to reason and apply the knowledge that they have learnt.
- suggesting a variety of methods, materials and assistive technological devices to solve a given problem. All learners should not be restricted to one method of solution when there are more than one especially the very best ones.
- requiring learners to explain their reasoning and their conclusions.
- encouraging independent and collaborative investigations and projects.
- requiring learners to make abstract generalisations based on the concrete manipulation of materials and/or their observations.
- encouraging teacher-learner and learner-learner discussion.
- setting assignments that are flexible enough to allow learners to not only demonstrate mastery of topics such as low level computation skills, but allow for more extensive, deeper investigation of topics of interest.
- making use of self-assessment and peer assessment in order to help learners become more responsible for their own learning.
- finding mentors for learners.
- creating opportunities for learners to work with others at their achievement level as well as opportunities for learners to do independent research and investigations. Bright learners need the opportunity to discuss mathematical concepts with others especially clever peers. Learners must be challenged to ask questions, to make conjectures, to explore and to develop mathematics that is new to them. They need outlets where they can share their discoveries with others.

Finally, mathematics clubs and competitions can serve to provide the gifted and talented learners further opportunities to enrich their mathematical abilities.

D. TEACHING DIFFERENT LEVELS WITHIN ONE YEAR GROUP

There will be learners within each class that need more time to be able to achieve the learning needed to demonstrate achievement of the SLOs. As learners progress through their learning journey they may move to a new year and start a new level but still have areas of unsecured learning from the previous level. The first important factor here is clarity of information on progress following this learner that makes it clear to their new teacher what support or additional work they may need to ensure that they can progress on to the new level.

Section C *Reaching different learners within each level* referred to the use of a range of strategies designed to respond to the different learning preferences of each learner. Where learners are entering the class in need of support to secure some aspects of the previous level it is important that:

- there is clear information about where the areas in need of support are.
- it is clear how these areas relate to progression and achievement in the new level.
- there are a range of strategies and learning devices available to match the learning style to the learner preference to assist with early progression.
- conversation with the learner about areas in need of support or reinforcement remains positive, learner-affirming and constructive.

One of the benefits of the LOF structure is that Levels 7 and 8 are delivered across two-year curriculum windows allowing time to develop learning programmes and deploy a range of learning methods to help learners progress and achieve.

There are a few models to consider when looking at introducing a measure of stretch for learners able to achieve SLOs well within the delivery time associated with the level. Educators may want to consider:

- exploring the SLOs in a broader and/or deeper way, perhaps looking to transfer or apply learning associated with the SLOs in new contexts.
- using more exacting or challenging texts.
- adding stretch by setting more challenging or complex tasks which exposes the learner to more challenging texts and vocabulary or introduces new Subject Foci or new areas of existing Subject Foci, remembering that the SLOs do not set a ceiling on the learning.
- looking at opportunities offered by the CCTs as sources of inspiration for introducing new areas of content to provide additional curriculum content that both enhances the subject learning experience and looks at CCT content in perhaps different or more challenging ways.

One other key source of material related to provision of additional challenge or stretch is the Subject Foci and SLOs from the level above. While it may not always be appropriate to begin to address these directly, educators may want to look at the contextual learning or preparation work that serves as a good introduction to learning at the next level. The focus here is on looking at the bridges between the learning in each level and how the learner can begin to access this learning. In this type of approach, as with the other areas of extension work, it will be important to keep a proper record of achievement to be able to inform teaching staff working with the learners when they move formally to the next level.

Although the above suggestions will help educators address the challenges of differentiation, it is nevertheless acknowledged that it is hard to implement differentiated instruction in a heterogeneous classroom, especially if educators are not supported or they do not know what they are differentiating – the curriculum or the instructional methods used to deliver it. It is hence important to give teachers clear guidance and support on what they need to do to differentiate instruction and be responsive to the needs of each learner by taking into account what they are teaching and who they are teaching. Time should also be factored in for teachers to assess their learners' needs, interest and readiness levels and to plan and design appropriate activities for each learner. These concerns can be addressed through effective professional development that strongly encourages teachers to apply their skills and which provides coaching throughout the process of using differentiation as a teaching approach.

E. TEACHING ONE LEVEL ACROSS TWO YEAR GROUPS

Within the LOF, Levels 7 and 8 have an added additional layer of challenge in curriculum planning and design in that both levels run across two different years. For example, Level 8 SLOs sit across Years 9 and 10. This means that educators need to consider how they might want to structure the delivery programmes needed to achieve the SLOs that will allow learning to take place in a meaningful and coherent way across two years that capitalises on any progression opportunities within the level. However, this wider window to reach the standard of a level also helps deal with some of the challenges discussed in the previous chapter.

When looking at the content shaped by the SLOs within a level, educators may be able to identify SLOs that are considered to be prerequisites for others in the same level and structure the curriculum accordingly. Some Subject Foci may naturally be delivered before others or educators may look to design and implement a curriculum that has more of a spiral curriculum progression feel to it. Educators may even feel that there are different ways to work with the Subject Foci, wrapping them up and addressing the SLOs by creating new subject areas incorporating the Subject Foci.

The decision on how best to approach the Subject Foci and the SLOs within the Subject Foci is essentially a local one. It is up to the educators to use their professional judgement on how best to do this based on their learners' needs, their preferred way of structuring the curriculum and the types of resources they intend to work with.

There are at least three obvious potential approaches that educators may wish to consider:

- Developing a period of ground work or preparation style learning before proceeding on to the curriculum directly associated with the SLOs.
- Developing a developmental approach across the existing SLOs where some suitable Subject Foci and corresponding SLOs are addressed before others with these supporting the learning of the SLOs to be covered in the second year.
- Developing a curriculum and learning programme approach that exhibits a mixture of the above two approaches.

There are also the more ambitious approaches where the Subject Foci and SLOs are absorbed into a more locally designed approach that may meet the strengths and interests of the staff and learners in a better way. Educators have the freedom to decide if there is a more integrated way to deliver and learn the subject. The LOF allows educators this measure of control and innovation to the benefit of their learners. Whichever the method selected, curriculum planning, resource selection and the selection of teaching strategies will all be important.

Assessment

A. METHODOLOGIES THAT WILL ENSURE FIT FOR PURPOSE ASSESSMENT

The main aim of assessment should be to provide teachers and learners with feedback on the effectiveness of teaching. It should serve to help teachers reflect on their own performance as well as that of their learners. This process of evaluation should help teachers identify what adjustments need to be done to the teaching and learning activities in order to maximise the learning of each individual learner (formative assessment). Assessment can also be used to summarise what a learner knows and can do at a particular point in time (summative assessment). However, it should not be used solely to certify a learner's attainment and to use this information to report progress to the learners themselves and their parents/guardians.

Summative assessment

Although formal assessment methods such as examinations and tests can give useful information to both the educator and the learners they should not be the only sources of summative feedback. Learners do learn in different ways and they show what they know and can do in different ways too. As the National Curriculum Framework (Ministry for Education and Employment, 2012 : 63) puts it:

> Assessment of the learners' achievement for summative purposes should not be dependent on one-off performances in tests and examinations. There is much to gain from considering information through multiple approaches to assessment carried out over a scholastic year. This leads to a more valid assessment of knowledge skills and attitudes within the different learning areas.

It is universally acknowledged that written examinations do not measure all the knowledge and skills that are required by tomorrow's future citizens (e.g. ability to use a weighing balance correctly; ability to explain orally; ability to use digital technology to solve a problem; ability to build a scale model of a pyramid; ability to find examples of two dimensional shapes from the environment; ability to select the correct instrument to measure a given distance; etc).

Accordingly, the summative assessment of a learner's performance should be based on formal one-off as well as on-going assessment methods. Examples of the former include:

- examinations – written and/or oral; end of cycle (e.g. at the end of secondary schooling measuring what was learnt from Year 7 to Year 11) and/or end of phase (e.g. at the end of middle school measuring what was learnt from Year 7 to Year 8); end of year (measuring what was learnt during all of that scholastic year), and/or mid-yearly (measuring what was learnt by midway of that scholastic year);[1] and,
- tests – written and/or oral; periodic (e.g. monthly), topic and/or take home tests ('special homeworks').

Examples of the latter include:

- schoolwork/homework
- class presentations
- reports of class experiments (eg dice experiments in probability)
- take home projects (eg producing a chart with tessellating shapes)
- surveys (eg colour of cars that pass in front of the learner's home)
- outdoor field activity write-ups (eg mathematics trails)
- cross-curricular activity reports (eg reporting on the mathematics involved in preparing a healthy meal activity within Home Economics reporting on the mathematics involved in a trekking activity using a compass within Physical Education)
- portfolios
- journals.

Formative assessment

It is important that teachers do not content themselves with simply obtaining data on what their learners know and can do at the end of a learning stage but that they use this data to identify the learning difficulties of their learners and to adjust the teaching and learning experiences in their classrooms accordingly. As such, data collected for summative purposes should also be used for formative purposes.

Other useful information on the effectiveness of teaching can be gathered on a daily basis by means of the following informal assessment methods:

- observations of learners' working – individually, cooperatively and collaboratively
- questions – open and closed teacher-learner, learner-learner and learner-teacher
- discussions – online and face to face teacher-learner and learner-learner
- classroom tasks – open and closed routine and non-routine practical and non-practical
- quizzes
- games.

Importance of Peer and Self-Assessment

In an age where lifelong learning is becoming the norm, learning to assess one's own performance in an effective and honest manner is a vital skill. It helps the learners of today become effective and successful learners of tomorrow. For this reason it is important that learners take responsibility for their own learning and contribute to the learning of their colleagues by using success criteria to assess their own learning and their peers'.

Importance of Problem-solving and Investigating

Given that problem-solving and investigating are at the heart of mathematics it is expected that the process of assessment will produce appropriate feedback on the teaching and learning process if it focuses on the learners' abilities to understand a problem and/or investigation; to select an appropriate strategy; to apply suitable conceptual, procedural and factual knowledge to solve it; and to verify and interpret the resulting answer. Thus it is recommended that the majority of assessment tasks should focus on problem-solving and investigating.

Importance of Communicating and Reasoning

The ability to communicate mathematics through oral, written and visual means is of paramount importance, as is the ability to conjecture, think and prove mathematically and so the ability to communicate and the ability to reason are critical components of any assessment process in the mathematics classroom.

Assessment

Assessment is an integral part of the learning and teaching process, providing students and their parents with continuous, timely and qualitative feedback about their children's progress, giving teachers' information about their practice and providing schools and colleges with information about their curriculum planning, learning and teaching.

Assessment *for* learning (assessment for formative purposes) is a process carried out as learning is taking place. Learners and their teachers use the outcomes to find what learners know and are able to do in relation to learning.

Assessment *of* learning (assessment for summative purposes) is carried out at the end of a unit, mid-year or at the end of the year.

Assessment *as* learning (ongoing assessment) is the use of ongoing self-assessment by learners in order to monitor their own learning.

In subjects that are taught as modules, assessment of learning will take place at the end of a module. Information and judgments about learning are pulled together in a summary form for purposes of reporting to parents and sharing information with other teachers in the next class or school. If learners are fully aware of what is expected of them (the learning intentions) and the success criteria against which their learning will be evaluated, they will develop the self-evaluation skills which will help them become self-directed learners.

Well-designed and appropriately implemented, classroom assessment processes can:

- support learners to use self-assessment to gauge their learning, identify their strengths, their learning needs and their next steps.
- encourage learners to support one another's learning through peer assessment.
- help teachers to understand children's learning better, use evidence to monitor learners' progress, reflect on their practice and adapt or match their teaching to their learners' needs.
- help teachers plan for the learning of individuals and groups and ensure that all children receive appropriate attention.
- support parents to share their children's learning experiences, interpret assessment information and follow their children's educational development.
- promote the reporting on individual progress and achievement in an incremental manner.

Colleges and schools are required to develop an assessment policy. The policy should seek to address the quantity and quality of assessment practices as well as reporting to parents and other stakeholders.

Adapted from *A National Curriculum Framework for All*, Ministry for Education and Employment (2012:41-42) and *Assessments as learning,* Lam (2015:1)

Learners and others involved in their learning need timely, accurate feedback about what they have learned and how much and how well they have learned it. This helps to identify what they need to do next and who can help them build up their knowledge, understanding and skills. A learner's progress should be assessed in ways and at times appropriate to their learning needs. Judgements made about this learning should be based on evidence from a broad range of sources, both in and out of school and by reference to a learner's progress over time and across a range of activities.

By planning for ongoing assessment opportunities and periodic testing, particularly where learners use their skills in an integrated way, educators will allow learners to demonstrate, over time, *how much* and *how well* they have learned.

A balance of ongoing and periodic assessment opportunities will require learners to demonstrate a body of learning built up over time and to apply their knowledge and skills in different contexts. Mixing a range of learner controlled formative assessment opportunities will allow the learners themselves gauge how they are progressing against individual or grouped SLOs.

Educators should look to gather a range of quality pieces of evidence to show progression in learning from both ongoing formative assessment opportunities and periodic, summative assessments. Learners should be involved in the selection of evidence. The evidence should show that the learner has understood a significant body of knowledge, has responded consistently well to challenging learning experiences and has been able to apply what they have learned in new and unfamiliar contexts.

Learning, teaching and assessment should be designed in ways that reflect how different learners progress in order to motivate and encourage them in their learning. To support this, all learners should be involved in planning and reflecting on their own learning, through formative assessment, self and peer evaluation and personal learning planning. Current approaches to assessment encourage the learner to carry out a number of communicative tasks. Once learners are given the chance to interact with their peers and receive constant feedback from their teacher, they are ultimately guided to make decisions on how to improve their mathematical knowledge and skills. The learners are thus given the chance to play an active role in self-assessment which encourages them to seek out personal goals for learning mathematics. These types of assessments can be planned at particular points, such as the end of a thematic unit, whereby the learners can judge and review their own performance.

Mathematics teachers will need to have a clear understanding of how their own learners are progressing in relation to others in their school and in other schools in Malta, against the outcomes and experiences at different levels. Regular, planned opportunities for dialogue are to be facilitated by Education Officers to help teachers reach a shared and consistent interpretation of meaning as they apply the SLOs.

Teachers must ensure that their view of what a learner has achieved is supported by sound evidence. Their evaluation of this evidence must be consistent with the evaluations of colleagues in their own, or another, department or centre. Departments/Centres should plan together and use their professional judgement in coming to a shared understanding of what it means to achieve a level in each of the four strands. Emerging national guidance will support this process. Moderation is particularly important at times of transition from one level to the next and in transitions between Middle and Secondary Years.

The delivery of the learning associated with the CCTs and the associated assessment is the responsibility of all teachers.

Improving the quality of teaching and learning also implies fostering a culture which ensures the transparency of quality assessment outcomes and having in place approaches, structures and roles played by internal and external school evaluation systems.

> *Quality assurance in education can be understood as policies, procedures, and practices that are designed to achieve, maintain or enhance quality in specific areas, and that rely on an evaluation process … [that is] a general process of systematic and critical analysis of a defined subject that includes the collection of relevant data and leads to judgements and/or recommendations for improvement. The evaluation can focus on various subjects: schools, school heads, teachers and other educational staff, programmes, local authorities, or the performance of the whole education system.*
>
> *Assuring Quality in Education: Policies and Approaches to School Evaluation in Europe,* European Commission (2015a:13)

Schools will need to begin to develop new quality assurance procedures, while enhancing existing ones, to support the introduction of the LOF and to secure its successful implementation in classrooms. This will need to be part of a whole-school implementation and quality strategy that could include opportunities for:

- Senior Management Teams taking an active interest in teacher CPD, monitoring teacher confidence levels and learner progress, e.g. sampling learners' work and leading whole-school self-evaluations.
- Heads of Schools creating shared preparation and planning time to help facilitate collaborative working.
- standards and expectations sharing through displaying learners' work aligned to levels to show progression, for example in work displayed on a 'learning wall'.
- staff engaging children and young people in discussions about progress and target-setting as part of planning to meet their learning needs.
- development of whole-school approaches to learning and assessment of CCTs.
- clear reporting strategies for feedback on progress within the school and outside the school, e.g. parents and guardians.

In Mathematics Departments (in addition to the activities listed above), educators will need to be engaged in:

- regular departmental meetings to plan learning, teaching and assessment in a coherent way, with colleagues sharing effective strategies which they see as improving learning and achievement of learners.
- collaborative planning with other teachers, peer review and discussion of standards and expectations when teaching learners at the same level.
- cross-marking end of topic tests, periodic assessments and other internal assessments by marking learner work from other classes or groups, educators can engage in professional dialogue about the nature of the assessment, its fitness for purpose and the learner results.
- design of assessment materials, marking schemes and reporting strategies in collaboration with other teachers within the department or with appropriate staff in neighbouring schools.
- adopting strategies to avoid pre-judging outcomes, for example marking learners' work without knowing who the learner is.
- professional dialogue around learners' work that has been pre-marked to help reach an agreed view on quality and standards.
- Communities of Practice to share and/or strengthen their professional practice, focusing on sufficiency in assessment, consistency in interpreting SLOs, reporting progress to learners, parents and guardians and other teachers.

The Directorate for Quality and Standards in Education (DQSE) will ensure that:

- Education Officers carry out quality assurance visits to validate accuracy of each school's self-evaluation evidence and sample quality and consistency of the learning, teaching and assessment.
- staff members collate and analyse a range of local and national data to be used as the basis of discussion with Heads of Schools, Deputies and Faculty Heads/Principals to inform planning for improvement of learners' achievements.
- where good practice is identified, Education Officers, School Management Teams and other key personnel organise good practice events for staff across schools within the authority to disseminate good practice.

It is here being acknowledged that any feedback coming from schools, including that yielded from assessment, should reflect the wider objectives of education. Moreover, Quality Assurance conclusions will not automatically impact on the performance of schools. Schools need more than information on their performance – they also need guidance on how to improve and support, while attempting such improvement. The ultimate aim of quality assurance procedures should be to provide schools with an appropriate, coherent and comprehensive evaluation strategy which has a positive impact on the school leadership team and on the quality of teaching and learning.

B. INCLUSIVE ASSESSMENT METHODOLOGIES

To help allow vibrant and diverse classrooms to thrive and demonstrate their learning potential educators need to ensure that assessment in the classroom is fair and inclusive, allowing every learner to show what they have achieved and how well they are progressing. Educators can ensure that assessment meets all learners' needs by providing each learner with appropriate support, employing a range of assessment methods and options and, in doing so, affording all learners the best chance of success. This will mean using performance and assessment information from a variety of sources to monitor progress and to inform what needs to happen next in the learning journey.

Educators need to be aware of, and work to, the relevant legislative frameworks that support learners experiencing barriers to learning. Barriers may exist as a result of family circumstances, disability or health needs and social or emotional factors. Where these circumstances occur, learners are entitled to have their additional support needs recognised and supported at the earliest possible stage – by the school, educational authorities and / or the state. Assessment strategies will be effective when educators use a range of assessment approaches flexibly to identify strengths, learning and support needs for vulnerable, disengaged and hard-to-reach learners in their classrooms.

Supporting vulnerable learners
Supporting vulnerable learners may mean using planning tools such as personal learning plans or multi-agency coordinated support plans. Educators need to place the learner at the centre to ensure each learner with additional or diverse learning needs can achieve positive and sustained educational outcomes.

Inclusion also means to be included in the mathematical practice of the classroom. Learning is considered to be a function of participation (Wenger, 1998). Participation is an active process that involves the whole person and combines 'doing, talking, thinking, feeling and belonging' (Wenger, 1998: 56).

Planning for inclusive teaching and learning in mathematics entails:

- gathering information on learners for better planning.
- adjusting the learning objectives and practices for learners with learning difficulties.
- planning appropriate mathematical activities – the teacher would have a repertoire of resources and strategies which respond to the individual needs of the learners.
- teaching strategies that address the diverse needs of learners, thus promoting inclusive teaching and learning in mathematics.
- incorporating various opportunities to encourage practical activities, application and reasoning to facilitate understanding.
- effective communication, which infers an awareness of thinking and learning style and an awareness of limitations such as language skills which goes beyond the ability to read the words but the ability to comprehend the maths meaning, poor short-term memory or slower speeds of working.

While schools need to consider which approaches will be most effective in helping to remove barriers to learning resulting from social and emotional circumstances including, for example, challenging behaviour, educators need to consider how these whole-school policies translate into action in the classroom.

Assessment planning and the resulting approaches taken (and instruments and methods used) need to ensure that all learners have an equal opportunity to demonstrate what they have learned and what they can do. Educators also need to consider what 'reasonable adjustments' to assessment approaches for disabled learners may look like in assessing ability. This may involve using appropriate assistive technologies. Given that good assessment practice is a key feature of teaching and learning, approaches used to help assess an individual learner's progress need to be as far as possible consistent with those used in the learning itself.

> The principle of the continuum of achievement should be such that it allows a learner to follow the best pathway that will allow him or her to reach the maximum of his or her potential - irrespective of whether the student is a high flyer, has average abilities, basic abilities and/or has a disability. In this regard the NCF sought to establish a framework that ensures that, as far as possible, no student becomes a casualty of an education system that is unable to identify those learners who require encouragement and guidance. Equally importantly, the NCF allows for the introduction of different pathways that will truly allow a learner to develop his or her abilities in the manner best suited for him or her.
>
> Adapted from *A National Curriculum Framework for All*, Ministry for Education and Employment (2012:5)

C. RELIABLE AND VALID WAYS OF ASSESSMENT

Assessment will involve planning high quality interactions with learners and will be based on thoughtful and probing questions drawn from the SLOs and designed to ascertain the extent to which the outcomes have been achieved. Learners will be clear about the kind and quality of work required to achieve success in the SLOs. The methods of assessment used need to reflect the nature of what is being assessed.

In the periods between formal assessment interventions individual learners should be encouraged to ask for and should be given timely feedback about the quality of their work that they can understand, reflect on and ask questions about. Educators should strive to encourage the learner's active engagement in discussion about their work and progress, and suggest the steps they can take to improve their performance.

Educators should seek to empower learners to develop the skills to evaluate their own and each other's work against the SLOs, encouraging them to develop an appreciation of their own learning needs, how well they are progressing towards achieving the standard exemplified by the SLOs and the types of action they need to take to improve their progress.

The SLOs have been written in a way that is designed to ensure that the learning expectation is clear. They also act like an anchor for any and all related assessment activity by defining the learning that is in scope for assessment activity and by omission being clear about what is not in scope. This makes the assessment process and assessment expectations more transparent for the learner. At times SLOs involve an additional layer of detail delivered through the use of exemplification to illustrate the nature of the challenge within the SLO or through a clear statement of what must be included as a minimum in addressing the learning associated with the SLO.

Where there is exemplification, the example given is designed to be indicative of the degree of difficulty or challenge expected to be reached in the SLO. The example adds a further layer of detail and clarity so the educator knows the standard the learner should be looking to achieve.

The following examples are taken from the Mathematics SLOs:
I can use and solve simple linear equations involving brackets, e.g. solve for $4(x - 1) = 2x + 6$

Taken from Level 7, Subject Focus: Algebra – Fundamentals of Algebra

I can use the rules for multiplying and dividing integer powers of numbers in positive, negative and zero indices.
e.g. $7^8 \times 7^{-5} = 7^3$, $(2^3)^5 = 2^{15}$

Taken from Level 8, Subject Focus: Number - Numerical Calculations (Ratio and Proportion)

I can give appropriate upper and lower bounds for measurement data given to a specified accuracy *e.g. measured lengths, measured weights*.

Taken from Level 9, Subject Focus: Shapes, Space & Measures – Measures (Length, Area, Volume, Mass and Capacity)

In the examples above each SLO has additional detail about the type and level of mathematics required. The immediate question one will ask will be about sufficiency. How much is enough? How many times do learners have to do this?

What the assessment should really be trying to establish is whether the learners have reached the standard of the SLO. Can they do what the SLO says they can do? Can they demonstrate the ability to do what the SLO claims for them and can they do it routinely, confidently and comfortably? Here the educator's professional judgement and the professional agreement on what constitutes achievement is important.

The assessment standard is not necessarily what is stated in the SLO. The standard is the shared and consistently applied interpretation of what acceptable learner performance in response to the SLO looks like. In order to reach this judgement, educators will need to work within the subject teaching community to agree what achievement looks like at each of the levels (e.g. Level 8), at the level of the Subject Foci within a level and at the level of an SLO where this is not immediately apparent and there is scope for ambiguity or interpretation.

Assessment within the LOFs will need to be subject to robust quality assurance procedures that are designed to instil confidence in teachers' assessment judgements and assure parents, guardians and other stakeholders that all learners will receive appropriate recognition for their achievements in line with the agreed national standards and that learners are making the appropriate progress in line with expectations.

Where assessment is for high stakes qualifications and external certification, particular safeguards are required to guarantee fairness to all young people and to provide assurance to parents and guardians, MCAST, the University of Malta and employers that the system is robust. To that end MATSEC will produce clear assessment plans for Level 9 and 10 assessment, detailing the balance between high-stakes external assessment and internal assessment procedures and quality assurance.

As learners approach points of transition (for example, across Levels) it is important to have rigorous and robust assessment and related quality assurance procedures in place in order to ensure that there is a reliable system for sharing information about progress and achievements. Again, MATSEC and/or DQSE will be responsible for producing the guidance documentation detailing the policy and procedures for any transition assessment arrangements involving high-stakes or external assessment.

Working the room: Measuring the impact of the teaching

This whole class assessment technique can be used with learners from Level 5 upwards. Challenge stations are set up around the room, a sufficient number to split the class into groups of 3-5 with a different challenge presented to each group. The challenges should be related to what has recently been taught in class and should be based on two or three distinct learning outcomes focusing on different aspects of a mathematics subject area e.g. learners' work on algebra or geometry. Challenges should have a level of differentiation and involve different types of activities so there is variation in the content and the nature of the work at each station. The groups should be balanced out evenly in terms of ability with the addition of the elements of time and reward to keep motivation up and maintain the competitive spirit. Each group should have time to reflect on the worksheets and performance at each table.

The assessment of the activity will provide a good idea of how the whole class has understood what has been taught and indicate areas where learners are less confident, allowing educators to reflect on which topics need to be revisited.

Adapted from *Designing Effective Activity Centers for Diverse Learners: A Guide for Teachers At All Grade Levels and for all Subject Areas*, Hilberg, Chang and Epaloose (2003)

D. ASSESSING CROSS CURRICULAR THEMES

The embedded CCTs within the SLOs are for guidance purposes only. As already indicated, the teacher may have better ideas of where, when and how to embed particular aspects of the CCTs.

The CCT icon in embedded SLOs is followed by a sub-heading from the CCT. This indicates the particular area of content that seems most appropriate for embedding within the delivery of the SLO.

The guidance about CCTs also describes how CCTs can be addressed through the choice of pedagogy or delivery style, classroom activity or approach to learning. Some may also be addressed through the introduction of whole-school or year group, curriculum enrichment activities or the adoption of particular sets of behaviours within the school community. The flexibility and freedom to decide upon and select which methods, opportunities and aspects of the CCTs are addressed when, where and how is entirely a subjective one. The aim is to ensure that the learners, through the course of their learning journey through the LOF, come into contact with the key learning associated with all the CCTs in significant and meaningful ways. The role of the CCTs is to yield resilient, adaptable, empowered young people with the robust, transferable skills the country needs to remain caring, inclusive, competitive and productive. This needs to be kept in mind when looking at the overall implementation and embedding of CCTs in the curricula.

This open and flexible approach to where, when and how CCTs are addressed is a challenge when it comes to trying to prescribe assessment approaches. While the lack of uniformity and consistency of when, where and how to embed CCTs in the LOF and in each subject area is attractive from a flexible delivery viewpoint, it represents a challenge in assessment from a standardisation standpoint.

The guidance around assessment of CCTs is simply to ensure that:

- the impact of the embedding strategy adopted at the classroom, departmental and school level is known and understood in terms of what has been learned.
- there is communication between schools, tutors and class teachers about the progress learners have made in coverage and acquisition of the CCT content.
- learners engage with each of the six CCTs with sufficient frequency, meaning and depth to allow them to achieve the key competencies they cover and to benefit from the new learning and skills each CCT introduces.

In each subject, educators may find it most beneficial to work with peers to determine the best-fit CCT opportunities, creating a support community to share development of resources and to help agree a consistent approach to teaching and assessment expectations when it comes to embedding the CCTs. Within this support community one can attempt to:

- agree which teaching approaches lend themselves to particular CCTs.
- share ideas and resource development.
- develop project-based approaches to SLO delivery that are enhanced by CCT inclusion.
- standardise assessment expectations around CCTs.

E. REPORTING PROGRESS

Learner and Parent/Guardian Reporting

Reporting on learning and progress should offer learners, parents, guardians and teachers insight into what learning expectations have been set, how the learner is progressing in relation to these learning expectations and how the learner can do what needs to be done to ensure continued progress and improvement as they go forward with their learning. Reporting should always be constructive, insightful and able to be used to stimulate meaningful discussion between the teacher, learner and their parent or guardian. It should, at the same time, be reflective, looking back at achievement, and forward-looking, focusing on improvement.

The LOF offers local flexibility for schools to decide how best to report information on learner progress, achievements and next steps within a clear set of national expectations. How frequent and what form such reporting takes are also decisions to be taken at the school and college level.

National expectations for reporting

Reporting will provide the learner, their parents or guardians with information on progress and achievement in each subject that includes:

- constructive, insightful and clear feedback throughout the learning experience.
- feedback on the learner's particular strengths, areas for development and completed achievements.
- feedback on the different curriculum areas.
- the particular support the learner is receiving to help them progress.
- attitude of the learner to learning.
- how home can play an active part in supporting the learning process.
- an opportunity to capture the learner's voice.
- an opportunity for parents/guardians to respond directly to the reporting feedback.

It is important that the reporting structure used is manageable for teachers.

Reporting is based upon the assessment of progress and there is a balance to be struck between how often assessment of progress is made and how often this progress is recorded and communicated to the learner and the parent/guardian. The reporting needs of the two groups are different:

- Learners should be receiving feedback on progress on an ongoing basis as a routine part of the learning and assessment process. The use of formative assessment (often called Assessment for Learning) should be a routine part of any assessment strategy. This makes this type of reporting frequent and continual.
- Parents and guardians need to be kept informed of their child's progress at key points in the learning journey where there needs to be feedback given around achievement and a discussion instigated between home and school about how further progress and improvement can be made. This makes this reporting much less frequent but recurring. At the very least, achievement of a level should be reported every time a level is achieved.

Reporting process
It is important to set up a process by which learners can take some ownership of what is reported. Educators should consider working with learners to determine which evidence should be drawn upon to summarise learning and progress for the purposes of reporting. This will invite reflection and dialogue about their learning and will be a useful opportunity to help the learner engage more deeply and meaningfully in discussion about their own learning. This type of dialogue will not restrict or impinge upon educators' professional judgements but will offer them some insight into the learner point of view and may help deepen their understanding of the impact of their own learning strategies.

The LOF offers the ability to report progress within the subject at different levels of detail. Each subject is broken down into levels, containing Subject Foci and each Subject Focus is further broken down into SLOs. With the SLOs making the outcomes of learning explicit, it will be important to establish what the learner, parent/guardian needs to know about progress against the SLOs and what can feasibly be shared, how often and when. Educators will first need to separate out internal reporting needs to chart a learner's progress, so that this can be shared with other teachers as they progress in other subjects, to benchmark progress more widely. Different audiences will need different details about learner progress.

The school and the relevant department need to set the policy on how they intend to report.

Internal Reporting

In order to maximise the opportunities that the LOF brings in terms of flexibility and freedom to help learners progress towards the learning expectations, the teacher will need to have a detailed appreciation of what the learner has already achieved and just how they relate to the learning expectations that the teacher is responsible for teaching. The teacher who comes next will also expect an appraisal of learner performance. It will be important to establish, through discussion with colleagues, how best to manage this internal communication and reporting in order to ensure a balance between what is helpful and insightful in assisting with the transition process and what is unwieldy, onerous and unmanageable.

It is important to remember that the detail that can be created around individual performance does not necessitate or promote an individualised teaching programme for each learner. Instead it is there to be used to facilitate a more responsive approach to curriculum design and more appropriate selection of teaching strategies and resource selection within the class.

As learners progress through the LOF, moving from level to level, year to year and class to class they will progress at different rates. This represents a challenge if learning is to remain fluid and continuous and progression is to be uninterrupted. That said, the Subject Foci and SLOs allow teachers to profile progress and achievement and to communicate that progress in a regular manner, indicating where the learner sits in relation to the overall expectations of a level, even indicating where there is some achievement beyond the level. The school is given the flexibility to decide how best it wants to communicate learner progress within the school and between those responsible for their learning and progression. Within the subject teaching team it will be important to identify an approach that is functional and clear within the subject and will ultimately maximise the Learning Outcome Framework's ability to chart progress in detail and in a personalised, learner-centric way.

A simple Achieved/Not Yet Achieved is clear feedback, yet it does not convey how close or far from being able to demonstrate achievement of the SLO the learner is. Educators may find it useful to come up with a convention that does more than just use a binary method of reporting achievement. Communicating more information about how a learner is relating to a particular level helps instigate discussion of where there may be particular learning challenges or where a learner has only started the learning associated with particular Learning Outcomes.

Evidence informing reporting should be drawn from a range of sources, including formal and informal assessment interventions, and educators should apply their professional judgement to a sufficient and robust body of evidence that allows them to report with confidence about progress made against a significant body of learning. Formal summative assessment interventions need to be subject to collaborative design and development and feature a measure of quality assurance and moderation to ensure what is reported is benchmarked against a wider understanding of the national standard.

How it is done elsewhere

The Scottish *Curriculum for Excellence* frames progression in relation to the learning expectations as developing, consolidating or having secured the learning objectives. These are not rigid categories but signposts indicating where the learner sits in relation to the expectations.

Typically, a learner who has started to engage in the work of a new level or area and starting to make progress in an increasing number of outcomes is at the Developing stage.

Once the learner has achieved a measure of breadth across the Subject Foci; can apply the learning in familiar situations; is beginning to show increased confidence by engaging in more challenging learning; and is starting to transfer their learning to less familiar contexts, they are engaged in a process of Consolidation.

Once significant achievement across the Subject Foci and outcomes has been recorded and there has been consistent success in meeting the level of challenge within the outcomes; learners are engaged in more challenging work; and are confidently transferring their learning and applying it in new and unfamiliar situations, their position in relation to expectations is viewed as Secure.

Adapted from *Building the Curriculum 5, A Framework for Assessment: Reporting,* The Scottish Government (2010)

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Appendix

Digital Literacy

Digital literacy has become essential for learning and life. Besides cutting across various disciplines it must now be considered as being a discipline of its own such as music, art, science and literature. Digital literacy education seeks to equip learners with the competencies (knowledge, skills and attitudes) in the use of digital technology needed to access learning opportunities, to pursue their chosen careers and leisure interests and to contribute to society as active citizens. It also aims to provide them with knowledge of the principles underpinning these technologies and a critical understanding of the implications of digital technology for individuals and societies.

Digitally literate learners learn to become independent, confident and discerning users of technology. Subsequently they acquire and develop critical and analytical attitudes to appropriately choose the right digital tools according to specific needs.

Digital literacy includes five categories of digital competencies, namely: Information Management, Communication and Collaboration, Digital Media, Using Digital Tools for Learning, Management of the Internet.

The competence in information management enables learners with the means to access, evaluate and analyse and hence make an informed choice from a range of available data and information sources. Competencies relating to Communication and Collaboration empower learners to learn to communicate, collaborate and network with others. Competencies in Digital Media enable learners to analyse messages mediated by digital media and to express themselves creatively across a range of digital media.

Digital literacy also involves competence in using digital tools in various media and in different modes of learning (autonomous, collaborative, exploratory, designing). Digitally literate learners will learn to be responsible and competent in managing the internet, keeping themselves safe and secure online, making informed choices over privacy, taking responsibility for their actions, respecting intellectual property, abiding by the terms and conditions of systems they use and respecting the rights and feelings of others. In teaching digital literacy, teachers should look for authentic, meaningful and socially inclusive learning opportunities which allow learners to apply and develop their skills, knowledge and understanding across the curriculum. Digitally literate learners should be able to undertake challenging creative projects, both individually and collaboratively comprising aspects from different competence categories.

Theme Learning Outcomes:

Information Management

- I am able to identify and articulate my information needs.
- I can find, select, use and combine information from a range of sources.
- I can safely and critically navigate between online sources and select information effectively
- I can navigate between online sources and select information effectively.
- I can create personal information strategies.

Communication

- I can communicate through a variety of digital devices and applications.
- I can adapt my communication modes and strategies according to the people I am communicating with.
- I can use different digital tools to share knowledge, content and resources.
- I can help others to share knowledge, content and resources.
- I know how to quote other people's work and to integrate new information into an existing body of knowledge.
- I can engage with on-line learning communities effectively.
- I can use digital technologies to participate in online citizenship.

Collaboration

- I can use technologies and media to work in teams and collaborate in learning.
- I can collaborate with others and co-construct and co-create resources, knowledge and learning.
- I can function well in digitally mediated Communities of Practice

Use of Digital Media

- I can review, revise and evaluate information presented in a range of digital media.
- I understand both how and why messages in digital media are constructed and for what purposes.
- I can examine how individuals interpret messages in digital media differently.
- I understand how values and points of view are included or excluded and how digital media can influence beliefs and behaviours.
- I understand the ethical / legal issues surrounding the access and use of digital media, including copyright, ownership, licensing and use of proprietary content or software.
- I can work creatively across a range of digital media and multiple systems to present information effectively to a given audience.
- I can edit and improve content that I had already created or that others have created, respecting and acknowledging the rights of the original author.
- I can express myself through digital media and technologies.

Managing Learning

- I can use various tools to manage my own learning.
- I can use various tools and approaches to collaborate with others in learning.
- I can use various tools to explore ideas, theories, relationships and procedures.
- I can use various tools to learn by designing digital objects.
- I can use various tools and approaches to reflect on learning.
- I can use various tools and approaches to evaluate what I have learnt.
- I can build and assess e-portfolios.
- I can work on multiple eLearning management systems and platforms.

Managing Internet Use

- I understand how the internet and the world wide web work and can use them for communication and collaboration.
- I am aware of and abide by the principles of netiquette.
- I know what constitutes plagiarism.
- I can protect my devices from online risks and threats.
- I can protect myself and others from possible online dangers (e.g. cyber bullying) by following appropriate privacy and confidentiality procedures.
- I am able to consider the social, cultural, religious and ethical implications of digital technology and can confidently communicate, share information, access and distribute content without infringing upon other peoples' intellectual property.
- I am aware of cultural diversity online.
- I can develop active strategies to discover inappropriate behaviour.
- I can create, adapt and manage one or multiple digital identities.
- I can protect my e-reputation.
- I can manage the data that I produce through several online accounts and applications to avoid health risks related with the use of technology in terms of threats to physical and psychological well-being.
- I recognise Cloud Computing as a converging technology on which I can work and save my material.

Education for Diversity

The National Curriculum Framework (NCF) acknowledges Malta's cultural diversity and values the history and traditions of its people. It acknowledges and respects individual differences of gender, colour, ethnic and social origin, language, religion or belief, political or any other opinion, membership of a national minority, birth, ableism, age or sexual orientation and geographical location. A curriculum that acknowledges the fact that diversity is a feature of Maltese society, as it is of nations across Europe and the world, that can contribute to national prosperity and social cohesion.

As a member state within the United Nations, Malta is a signatory to international human rights instruments including the Universal Declaration of Human Rights (1948), the European Convention for the Protection of Human Rights and Fundamental Freedoms (1950), the International Covenant on Civil and Political Rights (1966), the International Covenenant on Economic, Social and Cultural Rights (1966) and the UN Convention on the Rights of the Child (1989). As a member of the European Union, Malta is legally bound by the EU Charter of Fundamental Rights.

These instruments set out international standards and commit Malta's government and people to democracy and to acknowledging that citizens and other residents have, and should enjoy, human rights without discrimination.

Consequently the NCF aims to help children acknowledge social justice and solidarity as key values in the development of the Maltese society and encourage young people to uphold fundamental democratic values and promote social justice.

Education for Diversity promotes an inclusive educational culture and challenges various educational processes such as decision making within schools, languages of instruction, methodologies used, learner interaction and learning resources. Education for Diversity ensures the inclusion of multiple perspectives and voices within the learning environment, provides spaces for learning about the languages, histories, traditions and cultures of non-dominant groups in a society, encourages team work and cooperative learning in multicultural, multi-ethnic and other diverse contexts, combines traditional and local knowledge and know-how with advanced science and technology and values the practice of multilingualism. In doing so, it encourages an understanding of global issues and the need for living together with different cultures and values.

Theme Learning Outcomes:

Self Awareness

- I am a person committed to democracy and understand that this means ensuring people of different views and cultures have their say and work together for a better society.
- I have a principled and ethical approach to life.
- I am committed to social justice and a democratic and inclusive society.
- I reserve judgement so that it may be made on a fair and rational basis.
- I strive to strike a balance between my rights and duties and those of others.

Social Change

- I uphold fundamental democratic values and work to promote social justice.
- I respect the different religious and humanist convictions, morals and beliefs that inform people's conceptions of right and wrong.
- I recognise unfairness, injustice and preferential treatment in daily life situations including racist, sexist and homophobic language and behaviour.
- I challenge expressions of prejudice and intolerance towards minorities such as racist, sexist and homophobic names, anecdotes and comments.
- I claim my rights and act on my duties knowing that my fellow learners and teachers have equal entitlement to their rights.
- I appreciate that the notion of 'identity' is complex and changing and limited as a concept in capturing who I am and that the idea of 'identities' is a more powerful way of understanding who I am and who others are.
- I attend and respond to my teachers and fellow learners and accept that they may have different points of view.

Communicating for Diversity

- I communicate with, work with and respect all of my fellow learners, teachers and adult helpers.
- I communicate with people who are different to understand how we are the same and to understand myself better.
- I strive to communicate effectively with others in a constructive, supportive and self-determined way.
- I can use effective language to challenge injustices and inequalities.
- I approach differences of opinion and conflicts of interest through dialogue, non-violent communication and consensus; where this fails, I am willing and able to use mediation.

Education for Entrepreneurship, Creativity and Innovation

While entrepreneurship, creativity and innovation can potentially be seen as being discrete attributes, it is perhaps more strategic to consider them as mutually reinforcing features of a more cohesive and singular aim: to ensure that the future citizens of Malta have the wherewithal to contribute to the sustainable prosperity of the nation in an increasingly competitive global economic and social contexts. The goals include the four main competence areas of personal and interpersonal skills, practical and cognitive skills. This more strategic vision reinforces the need for an approach to Entrepreneurship, Innovation and Creativity that permeates all aspects of the curriculum, while being clearly signposted to ensure that learners' entitlements are being met and that learning and teaching in relation to these themes can be quality assured.

The overall goals of entrepreneurship education are to give learners the attitudes, knowledge and capacity to act in an entrepreneurial way and to acquire the skills that will promote their lifelong employability in a rapidly changing commercial, economic and social environment. This includes becoming entrepreneurial citizens in other spheres beyond industry or employability. These goals require the development of the 'soft' generic personal and interpersonal skills fundamental to becoming entrepreneurial, as well as the fostering of the more discrete entrepreneurial knowledge and understanding required to pursue entrepreneurial endeavours and to possess an entrepreneurial mindset which is both creative and innovative.

Creativity is generally recognised as both an innate yet often under-developed quality in young people, as well as a practical skill that helps to unlock an entrepreneurial disposition. It is a skill that can be taught and that everyone can aspire to. It involves opening up young peoples' thinking processes in ways that help them to look at familiar things with a fresh eye, to identify and frame a problem and to generate solutions whilst using their imagination, knowledge and skills to explore new possibilities rather than established approaches.

The ability to be innovative and the confidence to look for innovative responses to opportunities or problems encountered is best nurtured in a safe, supportive environment where this type of approach is encouraged, recognised and rewarded. Such a pedagogy requires allowing learners time to reflect on a situation and tap their resources and imagination to develop plans and solutions. It also requires time for implementation of new processes and the application of new ideas. Teaching and learning for innovation might even include space to 'learn from failure'.

Theme Learning Outcomes:

Personal

- I can work effectively on my own.
- I am resilient and can perservere.
- I understand the importance of nurturing a positive self-image, self-esteem and self confidence.
- I recognise the importance of integrity and ethical values.

Interpersonal

- I know how to communicate my proposed strategies to others effectively.
- I am able to contribute to a team.
- I am able to take the lead.

Cognitive

- I am able to solve problems imaginatively and laterally.
- I am able to think critically.
- I am able to consider different perspectives.
- I can recognise that entrepreneurship and innovation should be underpinned by ethics and values relating to social justice and sustainability.

Practical

- I can turn creative ideas into action.
- I have a basic set of research skills.
- I am able to audit my own skills and interests in order to consider future academic and vocational career choices.
- I appreciate the importance that creativity and entrepreneurship have played in the development and progress of human society.

Education for Sustainable Development

Education for Sustainable Development (ESD) helps learners to develop the necessary competences (knowledge, skills, values, attitudes and behaviour) that enable them to become sustainable citizens. ESD empowers individuals to actively participate in decision making processes which are compatible with living within the environmental limits of our planet in a just, diverse, equitable and peaceful society.

ESD seeks to ensure that learners:

- Develop a sense of identity and belonging to their local, national, regional and global community.
- Are empowered to adopt their roles and responsibilities within a globally interdependent world.
- Understand and are empowered to address the real causes and consequences of unsustainable behaviour within the context of an interdependent and globalised world.
- Develop a future-oriented perspective that highlights the significance of their decisions, choices and actions on the quality of life of present and future generations.
- Are exposed to diverse learning environments using a broad array of educational experiences.
- Develop a holistic concept of the environment involving natural, social, economic, physical and cultural perspectives.
- Value and respect social, cultural and ecological diversity.
- Are committed to action to bring about change.

ESD should be achieved through a whole-school approach that involves the reorientation not only of the curriculum, but also of the school culture, the school campus management, the school community and the wider local community in line with sustainable development.

Learners should experience ESD through transformative pedagogies that facilitate ESD teaching and learning experiences that promote the acquisition of the knowledge, skills, values, attitudes and behaviours necessary to become active global citizens.

ESD should be a lifelong learning process involving a blend of learner-centred processes, such as participatory/ collaborative learning; problem-based learning; inter-disciplinary learning; multi-stakeholder social learning; critical and systemic thinking-based learning; action learning; learning outside the classroom; experiential learning; reflective evaluation and using relevant real-world contexts.

Theme Learning Outcomes:

Learning to Know

- I can explain how the natural, social, cultural and economic systems work and are interrelated.
- I can describe my role as a citizen within the local, national, regional and global context.
- I can recognise the relationship between understanding others and the wellbeing of all in the present and the future.
- I can identify the root causes of inequality and injustice and actions that lead to a better quality of life, equity, solidarity and environmental sustainability.
- I can justify the importance of identifying problems, reflecting critically, thinking creatively and having a wider vision in order to plan for the future and become an effective agent of change.
- I can recognise the importance of lifelong learning and use such learning experiences to approach new challenges and be in a better position to take informed decisions and evaluate their consequences.

Learning to Do

- I can communicate my ideas and present my opinions in thoughtful and informed discussions and decision making processes.
- I can critically assess processes of change in society and envision a more equitable and sustainable world.
- I can identify priorities and evaluate potential consequences of different decisions and actions.
- I am able to collaborate with people having different perspectives on dilemmas, issues, tensions and conflicts from different disciplines/places/cultures/generations.
- I can use the natural, social and built environment that surrounds me, as a context and source of learning.
- I can involve myself and others in real-world issues to bring about a positive difference.

Learning to Be

- I am a critically reflective person and am able to evaluate decisions, choices and actions.
- I am responsible for my actions and capable of anticipating, adapting to and facing change.
- I can reflect upon the consequences of my actions on present and future generations.
- I am sensitive to divergent disciplines and perspectives, cultures and minority groups, including indigenous knowledge and worldviews without prejudices and preconceptions.
- I am motivated to make a positive contribution to other people and their social and natural environment, locally and globally.
- I am able to creatively and innovatively take considered action and challenge assumptions underlying unsustainable practice.

Learning to Live Together

- I can live in harmony with myself, others and the natural world at a range of levels from the local to the global.
- I respect and value diversity and challenge social injustice.
- I have a future-oriented perspective for how I live my life as a citizen of the world.
- I actively engage myself with different groups across generations, cultures, places and disciplines.
- I can actively participate in processes and encourage negotiations for alternative sustainable futures.
- I will help others clarify diverse worldviews through dialogue and recognize that alternative frameworks exist.
- I will challenge unsustainable practices across educational systems, including at the institutional level.

Learning to Learn & Cooperative Learning

The aims of Learning to Learn are for learners to:

- Focus on learning processes as well as final performances.
- Hold a rich conception of learning and based on a personal conviction to manage own learning.
- Acquire a wide range of strategies for learning.
- Develop strategies to plan, monitor and review their own learning.
- Become competent in self-assessment.

Theme Learning Outcomes:

Social Learning

- I can appreciate diverse viewpoints and personalities.
- I am confident in discussing my views with others.
- I can follow the ideas of others and comment on their views.
- I can follow group discussions and collaboration and summarise what is being said or done.
- I collaborate with other learners as part of my learning.
- I learn by designing products with others.
- I seek out and am open for guidance and support from peers and adults.
- I am able to talk with others about learning.
- I listen to others talk about learning.
- I can discuss various subjects and learning strategies with peers.
- I can debate and support my argument without being judgemental while still empathising with others.
- I can learn about my needs to make the right choices.

Personal Learning

- I can identify the support and resources I need to learn.
- I am aware of my preferred way to learn and can use this to plan my own learning.
- I manage goals and time efficiently in learning.
- I feel competent in managing my own learning.
- I am open to feedback from others and am able to consider it for my personal improvement.
- I reorganise myself by explicitly changing my assumptions over time.
- I am able to follow my own interests as this helps me to reflect on ‘who I am’.
- I am pleased when I succeed at difficult tasks.
- I believe that effort can lead to success.
- I reflect on my mistakes and learn from them.

Cognitive Learning

- I am able to remember by recalling, recognising and locating information.
- I am able to link new information to my existing knowledge.
- I am able to analyse information that I come across.
- I evaluate knowledge in terms of my learning objectives and my preferred way of learning.
- I am able to solve problems on my own and in collaboration with others.
- I am able to assess myself as this helps me to understand what I know and who I am.
- I assess myself to analyse and further develop my ideas.

- I assess my peers to compare what I know to what others know, gaining knowledge of what mental models others hold of a particular concept and how these mental models can evolve for understanding to happen.
- I am able to focus on the main subject and summarise important points.
- I am able to apply my knowledge and understanding in differing contexts.
- I can manage my own learning to improve important skills including literacy and numeracy skills.
- I understand that learning involves different processes.

Creative Learning

- I take initiative in designing new products.
- I am able to think about new ways of making good use of objects.
- I am able to use my imagination and creativity.
- I prefer to move on to challenging tasks rather than stay on easy ones.
- I am able to face new, challenging experiences and learn from them.
- I learn by exploring events, life experiences and the physical environment.
- I am able to engage in unplanned spontaneous play.
- I am able to engage in planned, purposeful play.
- I understand that I can improve and learn and that if I am stuck I can think upon my difficulties, solve my problems and move forward.

Literacy

One of the most important aspects of literacy in Malta is the implication that a literate person is fluent in both Maltese and English. An essential factor to ensure that Malta remains a bilingual country is making sure that its learners develop equal competences in reading, writing, speaking, listening and comprehending in both official languages from the early years, preferably from kindergarten. Another is ensuring that learners develop the skill to switch easily from Maltese to English (or vice versa) depending on the situational need. Achieving bilingual literacy in our education means that all our young people feel comfortable and confident using both languages.

Literacy development will require a whole-school approach that is clearly reflected in school policies where there is a conscious effort in which a community for literacy is promoted throughout the curriculum. Literacy for learning is an intrinsic part of school life and every subject domain can serve as a context whereby literacy skills development could be enhanced. Furthermore, schools should strive for a literacy rich environment using technology as a platform.

The relevance of reading aloud and presenting ideas to an audience and the opportunities for contextualised language and play acting (drama) should be clearly identified as components of spoken literacy across the curriculum. Stressing the importance of oracy is key to encouraging active learning cultures and communities.

With regard to reading, the fun and interactive aspect of reading is very important; the purpose of reading should initially be for fun/interest and communication. The value of entertainment in reading, which is closely linked to attitude and disposition to language, is crucial especially in the Early and Junior Years. Critical and creative thinking, where the learner increasingly takes control of texts in different domains and gains awareness, will follow.

Theme Learning Outcomes:

Listening and speaking

- I can converse in a range of situations, both formal and informal, matching register and language to the situation and audience.
- I can listen to and understand spoken text well and respond or apply the information appropriately with comments and/or questions.
- I can use langauge to present my thinking logically and clearly and can talk to engage an audience while analysing and evaluation through an open-ended approach.
- I can use spoken language to share my ideas in a collaborative way, appreciating the social elements of conversation such as waiting for my turn and listening to what others have to say.

Expressive language

- I can use expressive language to develop my own thinking, using words to explore, clarify and confirm ideas.
- I can use expressive language to develop my thinking and the thinking of others by contributing to the explorative talk of my peers and the dialogic talk of my teachers.
- I can use expressive language to organise and rehearse ideas, arguments and language structures in order to synthesise and evaluate before writing and while editing.

Reading and understanding

- I can decode print effectively and successfully establish multisensory linking and phonemic awareness between grapheme and phoneme.
- I can read text in a fluent manner and understand what is written, gain knowledge and enjoy the process.
- I can select real, virtual and multimedia texts to entertain and inform me, constructing meaning from text, using words and visual or audio information to confirm, complement or change what I already know while discarding the superfluous.
- I can approach texts purposefully: I am aware of what I hope to gain from them and am able to use retrieval devices, cross references and links to follow themes or ideas through various means including texts accessed via technology.
- I can select appropriate texts for my purposes, taking account of implied readership and provenance as well as subject matter and format.
- I can identify and follow the different reading conventions of my academic subjects, regarding the place and purpose of reading texts in learning and in questioning or accepting the authority of these texts.

Writing

- I can draw on what I have read, what I have done and what I have felt at home, at school and at play to inform my writing.
- I can convey my thoughts powerfully and eloquently through speech and text.
- I can select the appropriate language, register, genre and medium for the texts I write.
- I can use writing in both manuscript (handwritten form) as well as digital form in order to inform, to persuade and to entertain other people.
- I can use writing to consider ideas and to reflect on and consolidate my own thinking and learning. I can follow the writing conventions of the genres and subjects I am studying.

Accuracy

- I can write accurately using language conventions and rules such as those established by Standard English / Kunsill Nazzjonali tal-Ilsien Malti / l-Akkademja tal-Malti.
- I can use my knowledge of morphology as well as my phonological awareness and visual memory to attempt to spell unfamiliar words and recognise correct spelling.
- I can use a range of punctuation marks to make my meaning clear to a reader.

Planning and reflection

- I can plan my written work and think what I want to communicate before I start to write.
- I can understand the need for drafting; I can edit and proofread my work and allow sufficient time in which to complete a piece of work.
- I can reflect about my writing and think about how I learn best.

Learning Outcomes Framework

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