Numeracy Policy

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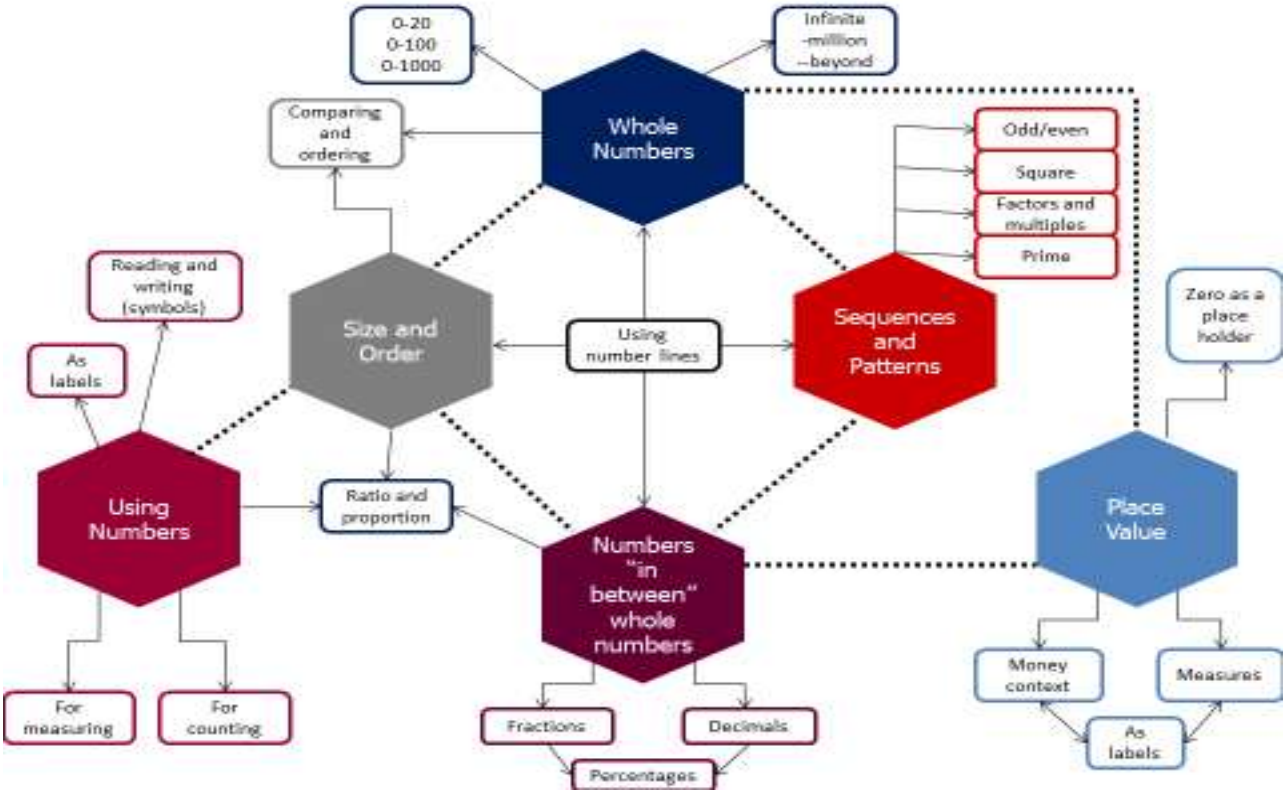
Approved / Adopted by Governing Body:	**October 2020**
Date Policy Reviewed:	**September 2021**
Date of Next Review:	**September 2022**

Mission Statement

All teaching staff should use every relevant subject to develop pupils' numerical fluency, when it supports the learning outcome. As such, the staff at Longfield Academy are committed to developing the skills of all our pupils, in the belief that it will support their learning and raise standards across the curriculum.

Focus for the Year

Confidence in numeracy and other mathematical skills is a precondition of success across the National Curriculum. Longfield aims to introduce and embed a new structured programme of numeracy tasks for all pupils which will take place during Friday form time sessions.



These We Are Longfield sessions will consist of numeracy tasks which challenge pupils in key areas of numeracy, such as, counting and understanding number, calculating, and knowledge-using and applying. There is a depth and range to the questions to accommodate the mixed ability of the form classes.

Each week in We Are Longfield curriculum time, pupils will attempt to complete fifteen numeracy questions in ten minutes at Key Stage 3 (KS3), and thirteen to fourteen numeracy questions in ten minutes at Key Stage 4 (KS4). KS4 numeracy questioning will be more word based to increase exposure to key examination vocabulary in preparation for GCSE examinations. The rationale for the style of questioning at both KS3 and KS4 will be given below. When they attend their mathematics lesson, their teachers will use these questions as connection activities to remedy the gap in the pupil's knowledge.

Pupils will mark their numeracy tests themselves and calculate their weekly score, informing their form tutor of their total. Form tutors will enter pupil scores into a Sim's marksheet for their form, enabling an analysis of progress over time. Through this analysis of results, interventions can be planned and implemented. Cross referencing through the mathematics department, Numeracy

PD time data and LAC pupils' data will collectively aim to identify pupils who need additional support and screening for dyscalculia using IDL Numeracy screening.

Rewards will be given to pupils who are consistently accurate within their spelling test and using numeracy skills correctly. The combined score of each task will be calculated centrally on a spreadsheet. There will be a weekly tutor group competition for each year group to find the form group with the highest average scores for spellings and numeracy. The winners will receive a trophy full of sweets.

Transfer of Skills:

Longfield Academy will deliver the National Curriculum knowledge, skills and understanding through the Numeracy Strategy Framework using direct interactive teaching, with a greater emphasis on problem solving across the maths curriculum. To this end, the mathematics department at Key Stage 3, will present pupils with examples to show how the numeracy they are about to learn, relates to real life. Through starter activities, pupils will also be reminded of the prior knowledge gained. The 'Activation' phase of the pupils' lessons will be led by the class teacher and allow the whole class to learn through discovery and exploration. This phase will illustrate skills of *Reasoning* and *Explaining* – knowing ***why*** as well as knowing ***that*** and ***how,*** which will be expressed using precise numerate language. To enhance the transfer of key knowledge and skills into other curriculum areas, pupils will attempt worked examples before tackling fluency style questioning. They will also complete word based cross-curriculum problem solving, including Finance, Science, Problem Solving and Open-Ended Problems. Most lesson plenaries will consist of a PEAL activity to link key numeracy skills with associated vocabulary skills. When a series of topics are completed, pupils will complete a 'review exercise' that helps to make connections between the different topics to assess the pupil's mastery of key numerate concepts.

Furthermore, KS4 pupils will complete numeracy booklets to illuminate the importance of conceptual and procedural continuity over time. In this way, KS4 pupils will build on learning from KS3 to further develop fluency, numerical reasoning, and competence in solving increasingly sophisticated problems.

However, in the interim, the transfer of numeracy skills from mathematics teaching to other curriculum areas is something that many pupils of the current cohort find difficult. The staff at Longfield fully understand and support the idea that it is essential that pupils realise the same skill is being used. Considering this, the Numeracy Coordinator is triangulating and working collaboratively with other Longfield staff, developing, and producing structures and frameworks that allow pupils to link knowledge between curriculum areas as they journey from subject to subject, year to year. For example, Science, PE and Mathematics, triangulated key pedagogy from each department and carried out a mini deep dive into medium- and long-term plans. As a result, they were able to formulate a framework to improve the quality of graphing knowledge and skills in our pupils. This framework will be used by all staff when their lesson learning objective involves creating or interpreting graphs. SPLAT is the first iteration of this intra curriculum collaboration. Pupils' can articulate Space, the size of the axes, Plot, coordinate points, Line of best fit, either through data points or lines of best fit for bi-variant data, Axes for labelling and correctly spaced graduation and Trend, what is the graph indicating or alluding too.

1. Roles and Responsibilities

Pupils

- Take increasing responsibility for recognising their specific needs in relation to numeracy and making appropriate improvements by responding to feedback. Use SPLAT correctly to guide improvement in accuracy and quality of their written answers.
- Use all numeracy initiatives at Longfield, including those focused on counting and understanding number, calculating, and knowledge-using and applying, to improve and make progress

Parents / Carers

- Encourage their child to use the range of strategies they have learned to develop their use of numeracy.
- Encourage wider independent use of counting and understanding number, calculating, and knowledge-using and applying.
- Where appropriate, attend numeracy parent / carer support sessions at the school to identify ways of supporting their child.
- Attend, if possible, school open evening events that aim to highlight numeracy activities and strategies used within their pupils' lessons.

Governors

- Specified governor responsible for numeracy, who endeavours to attend all appropriate training and CPD sessions associated with numeracy.

ALL Teaching Staff

- In accordance with Teacher Standards, teaching staff demonstrate an understanding of, and taking responsibility for, promoting high standards in relation to numeracy and the correct use of numeric skills, ensuring skills relevant to the subject are taught explicitly to enable pupils to make expected progress.
- Ensure that marking of numeracy, appropriate to their department, is carried out.
- Promote high standards of numerate skills use at all times.
- Ensure that they are familiar with correct mathematical language, notation, conventions and techniques, relating to their own subject and encourage pupils to use these correctly.
- Be aware of appropriate expectations of pupils and difficulties that might be experienced with numeracy skills.

- Provide information for mathematics teachers on the stage at which specific numeracy skills will be required for particular groups.
- Provide resources for mathematics teachers to enable them to use examples of applications of numeracy relating to other subjects in mathematics lessons.

Numeracy Leader

- Devises, implements, monitors and evaluates the strategy for the teaching of numeracy and the development and improvement of numeracy skills for all pupils across all departments.
- Improves the counting and understanding number, calculating, and knowledge-using and applying levels of all pupils in the school and reports to the leadership team and Governors on a regular basis regarding progress.
- Leads CPD in relation to numeracy as required.
- Coordinates learning walks/work scrutiny with a numeracy focus.

Teachers of Mathematics Should:

- Contribute to pupils' development of the knowledge associated with counting and understanding number, calculating, and knowledge-using and applying, since the development of this knowledge are integral to all lessons.
- Be aware of the mathematical techniques used in other subjects and provide assistance and advice to other departments to ensure a correct, efficient, consistent and effective approach is used.
- Provide information to other staff on appropriate expectations of pupils and difficulties that are likely to be experienced in various age and ability groups.
- Seek opportunities to use topics and examination questions from other subjects in mathematics lessons to help learners to remember, in the long term, the content they have been taught, integrating new knowledge.
- On a rolling program of implementation, the Numeracy Coordinator will continue to introduce questioning from curriculum areas into the We Are Longfield activity.

Department Heads

- Responsible for ensuring that all schemes of learning for their department incorporate provision for the teaching of numeracy for all pupils, in line with this policy.
- Ensure that marking of numeracy, appropriate to their department, is carried out in line with this relevant policy.
- Monitor the effective teaching of numeracy within the department, through lesson observations, work scrutiny and pupil voice.

1. To Improve Provision Across the School the Numeracy Policy Will:

- Raise the standards of numeracy of all pupils by being efficient and effective in its use of resources.
- Develop the ability of all pupils to use numeracy skills effectively in all areas of the curriculum.
- To ensure consistency of practice including methods, vocabulary, notation, etc.
- To provide materials to support numeracy in other subjects.
- To identify pupils with the necessary skills to support other pupils in lessons.
- To indicate areas for collaboration between subjects.
- To assist the transfer of pupils' knowledge, skills and understanding between subjects.
- Develop the numeracy knowledge necessary to cope confidently with the demands of further education, employment and adult life.

2. Intervention Strategies

A range of intervention strategies will be used to support identified pupils to improve skills. These will include:

- Functional Skills classes that are flexible in their planning. This enables Longfield staff to address identified gaps in pupil's numeracy knowledge, which hinder their capacity to learn and apply new content. Primarily focused and pupils identified as not Secondary School Ready.
- Numeracy Five Sessions Per Week booklet to practice, retrieve and gain confidence in key number skills and knowledge, especially the four rules of arithmetic.
- *MathsBeat*, IDL and Numicon for the least able pupils
- Parental support

3. Parental Support

Parents / carers will be offered open evenings to explain the following (where needed):

- Numeracy PD strategy
- *MathsBeat*
- Numeracy Five Sessions Per Week booklet

4. CPD Opportunities

All staff will receive training in the delivery of the numeracy booklets. They will also receive CPD on the cross-curriculum numeracy programme. Intra-curriculum working between departments will continue to be strengthened.

5. UK Junior Mathematics Challenge

- KS3 pupils will be entered into the annual UK mathematics challenge
- KS3 girls will be invited into the GCHQ cyber code cracking tournament
- Quizzical lunch time tournament
- KS2 transition using Primary UK maths challenge
- Robotics programming that involves numerical variables, time, distance, rotational parameters,

Rationale for Numeracy We are Longfield Booklets

The staff of Longfield Academy have taken guidance from the National Curriculum to which pupils should be taught to apply arithmetic fluently to problems, understand and use measures, make estimates and sense check their work. Pupils should apply their geometric and algebraic understanding and relate their understanding of probability to the notions of risk and uncertainty. They should also understand the cycle of collecting, presenting and analysing data. They should be taught to apply their mathematics to both routine and non-routine problems, including breaking down more complex problems into a series of simpler steps, together with exposure to inverse operations.

In addition, Longfield staff also recognise pupils should become confident that they know what a word means so that they can follow the instructions in a given question or interpret a mathematical problem. For example, a pupil reading a question including the word perimeter, should immediately recall what that is and start to think about the concept rather than struggling with the word. This 'wondering' leads to a loss of confidence in their ability to answer the question. The instant recall of vocabulary and meanings can be improved. This will also support the school's Literacy policy.

From these two stand points, the aim of the questions posed within the numeracy booklets is to develop increased Storage Strength of ***numerical knowledge*** together with increased Retrieval Strength of ***numerical knowledge***. The questions allow pupils to practice '***commutative law of addition'***

i.e. 347 + 153 can be expressed as 153 + 347

'associated law of addition'

(25 + 39) + 41 can be expressed as 25 + (39 + 41)

with the aim of increasing pupils' ability to use non-written methods to solve the addition.

In conjunction with and recognising, '***inverse relationship'*** between addition and subtraction

638 +  = 954 531 -  = 327

During the multiplication and division - **calculating** aspect of their numeracy activity, pupils' practice, ***'commutative law of multiplication'***,

9 x 13 can be expressed as 13 x 9 and like wise

'associative law of multiplication'

(3 x 5) x 7 can be expressed as 3 x (5 x 7)

and ***'distributive law'*** of multiplication over addition at KS3.

56 x 47 + 44 x 47

can be expressed as (56 + 44) x 47

(100) x 47

4700

Divisibility laws are also encountered by the pupils, such as,

360 ÷ ☐ = 15 can be expressed as, by using the inverse

360 ÷ 15 = ☐

24 = ☐

In addition to this, KS4 questioning aims to remove literacy barriers to learning by word-based problem solving. The example of 'perimeter' is practiced over several weeks during PD time numeracy, interleaved with multiplication of integers and decimals.

The structure of the numeracy tasks allows for ***Interleaved Practice*** where problems of a similar structure are repeated over a number of weeks to improve Retrieval Strength.

Whole School Approach on the Use of Calculators

In deciding when pupils use a calculator in lessons ensures that:

- Pupils' first resort should be mental methods.
- Pupils have sufficient understanding of the calculation to decide the most appropriate method: mental, pencil and paper or calculator.
- Pupils have the technical skills required to use the basic facilities of a calculator constructively and efficiently, the order in which to use keys, how to enter numbers as money, measures, fractions, etc.
- Pupils understand the four arithmetical operations and recognise which to use to solve a particular problem.

- When using a calculator, pupils are aware of the processes required and are able to say whether their answer is reasonable.
- Pupils can interpret the calculator display in context (e.g. 5.3 is £5.30 in money calculations).
- Staff help pupils, where necessary, to use the correct order of operations – especially in multi-step calculations, such as (3.2 - 1.65) x (15.6 - 5.77).
- Staff and pupils understand the limitation of calculators regarding negative numbers.

Vocabulary:

The following are used as important aspects of helping pupils with the technical vocabulary of Mathematics:

- Using a variety of words that have the same meaning e.g. add, plus, sum.
- Encouraging pupils to be less dependent on simple words e.g. exposing them to the word 'multiply' as a replacement for 'times'.
- Discussion about words that have different meanings in mathematics from everyday life: e.g. take away, volume, product range. Product range in Science topics means the greatest and smallest values in the data set, whereas in mathematics, range demonstrates the *difference* in value between the largest and smallest values in a data set.
- Highlighting word sources e.g. quad means 4, cent means 100 so that pupils can use them to help remember meanings. This applies to both prefixes and suffixes to words.
- Introducing new vocabulary using the 'expand it' template used across the school (as shown below).