

# Milngavie Primary School & Early Years Centre



## Numeracy Strategy Paper

### Quality Indicators

QI 1.1	Self-evaluation for self-improvement
QI 1.2	Leadership of learning
Leadership of learning	Leadership of change
QI 1.5	Management of resources to promote equity
QI 2.2	Curriculum
QI 2.3	Learning, teaching and assessment
QI 2.5	Family learning
QI 2.6	Transitions
QI 2.7	Partnerships
QI 3.1	Improving wellbeing, equality and inclusion
QI 3.2	Raising attainment and achievement
QI 3.3	Increasing creativity and employability



## RATIONALE

Numeracy is at the core of education at Milngavie Primary School and Early Years Centre(EYC). Mathematics is important in everyday life allowing us to make sense of the world around us, to contribute effectively and develop the capacity to be creative and think logically. Together, the pupils, staff and community provide a supportive and nurturing environment, from which we aim to develop and deliver an effective Numeracy curriculum to ensure that throughout our school and EYC we develop understanding, depth of knowledge and courage to predict and challenge our maths thinking.

### Numeracy and Mathematics Curriculum

Numeracy and Mathematics in the school and EYC covers a broad range of teaching and learning experiences, from the basic delivery of the educational programmes in class and ELCC to more specialised areas such as learning support and supporting vulnerable groups.

Numeracy and Mathematics as set out in the Curriculum for Excellence is organised into three areas:

1. Number, money and measure,
2. Information Handling
3. Shape, position and movement

Milngavie Primary School and EYC have addressed each of these organisers individually when developing our strategy to ensure a cohesive approach in all year groups throughout the school year.

Our strategies acknowledge relevant current research and effective practice and chime with the Scottish Government's Attainment Challenge. Furthermore, our strategies take account of the specific additional support needs of pupils in both school and EYC and the presumption of mainstream education as set out by the Scottish Government.

To effectively develop this strategy paper we worked with Candace Sinclair a Scottish Government Advisor from Children and Young People Collaborative to ensure a robust and comprehensive approach to strategy development.

To develop and address the goals set out by the school and EYC, the school has undertaken strategic analysis of our current practices. Self evaluation of the programmes delivered, has allowed identification of good practice, and more significantly the identification of current needs in our school community and its wider context.

The current demands made on our pupils and their families, by shifting changes in societal needs, have placed development of strategic thinking as a key area for development within the school. For example, early algebraic thinking develops deeper mathematical understanding and greater confidence in using maths within varied contexts and other areas of the curriculum and life. Such strategy development will help in the future to develop a more diverse and representative workforce, and achieve better outcomes for all learners.

In line with Education Scotland, the National Improvement Framework and the aims of the Scottish Government, Milngavie Primary School and EYC place numeracy, literacy and health and wellbeing at the core of its teaching programmes. All good teaching and learning takes place in a reflective cycle and such reflections require re-appraisal of ongoing practices. This paper sets out to define in brief the goals we have set as a school and EYC to continue to address the development of numeracy and mathematics effectively within the school and EYC setting.

### **Goals**

1. To continue to support the progressive systematic teaching of maths and numeracy across all year groups
2. To develop knowledge, understanding, depth and breadth in the three key areas of Number, money and measure, Shape, position and movement, Information handling
3. To continue to embed in all year groups key maths strategies to allow strong foundations to be created for maths development and understanding
4. To develop updated progressive programmes in mental maths and problem solving
5. To ensure robust self-evaluation and quality assurance to drive forward improvements, through planning, implementation and embedding in the school curriculum

### **Attainment of Goals in Numeracy and Mathematics**

#### **1. Progressive systematic teaching of maths and numeracy across all year groups**

The Numeracy and Mathematics programme in Milngavie Primary School and EYC is delivered throughout the school using a variety of learning approaches and resources. Activities include opportunities for oral, mental, written and practical activities.

Pupils experience working as whole class, in groups or as individuals. Practical activities and cross curricular activities allow pupils to develop an understanding of the wider relevance of maths skills and their relationship to skills used for learning, life and work.

Collaborative learning allows pupils to reason logically and creatively through the discussion of mathematical concepts, strategies and ideas. This wide variety of learning opportunities allows pupils to experience choice, breadth, challenge and enjoyment.

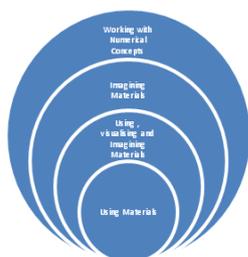
Key to the overall delivery is the use of our core mathematics schemes. In the EYC, P1 and P2 'Play to Learn' strategies are supported by the use of concrete materials, Numicon (a flexible maths resource which allows maths exploration using the concrete-pictorial-abstract approach) and Heinemann Active Maths.

The use of Numicon transfers into the early primary years as an essential concrete support for numeracy development and understanding together with 'Play to Learn' strategies which in turn is supported by Teejay maths.

Teejay maths is used as the core mathematics scheme from P1 to P7. This programme provides coherent learning experiences at Early, First and Second level, such that at the end of a level a pupil will have covered all the appropriate Benchmarks, Experiences and Outcomes, developed skills and knowledge, understanding, reasoning and logical understanding.

## 2. Developing knowledge, understanding, depth and breadth in the three key areas

The development of sound mathematical skills and knowledge can be represented by the following, where progression from the use of concrete tangible materials leads through exposure and practice leads to abstract manipulations.



Key to developing positive attitudes to maths and numeracy starts in the early years, where pupils in the EYC and P1-3 experience creative and logical thinking through active play and outdoor learning. Throughout Early and First levels, pupils will experience the power of play to support maths, developing skills such as exploration, problem solving, experimentation, risk taking, negotiating, collaboration, and creativity so pupils will develop an inherent stronger sense of mathematical thinking. In addition, play allows pupils to experience success and failure in a safe controlled environment, which in turn fosters the skills and strategies needed to deal with increasingly complex mathematical challenges.

In Second level, the context of play in maths is experienced through the continued use of outdoor learning and interdisciplinary learning experiences, such as Credit Union, Enterprise and **STEM activities** as outlined in the STEM Strategy paper.

This multi-faceted approach, building year on year, has been devised to create a coherent and responsive teaching programme. The programme also provides where necessary additional support for our more and less able pupils who require targeted individual or group work (Maths Recovery, SEAL maths, NRICH, Spotlight maths).

**Commented [01]:** Cross ref to STEM Policy – to be reviewed by Parent Council Nov 2019

**Commented [02R1]:**

### 3. Continue to embed in all year groups the key maths strategies to allow the strong foundations to be created for maths development

Maths strategy and maths knowledge are interlinked. Strategies describe the mental processes pupils use to estimate and solve problems. Knowledge, describes the underpinning ability to recall and use facts and processes, without thought. Knowledge provides the foundation on which evermore complex strategies can be built and use which in turn develops further strategic thinking, skills, knowledge and understanding.



Mathematics is a key in developing skills for learning, skills for life and skills for the work place. Creating strong foundations in mathematics in addition to breadth, challenge and application develops creativity and employability skills for an ever changing work place. Milngavie Primary and EYC continue to work on our strong foundations in knowledge and understanding by further extending our pupils with a wider range of experience.

Through 'Grounds for Learning' staff training, class participation in the John Muir award 'Discover, Explore, Conserve' and close links with the local country park, outdoor learning experiences have become embedded in the school curriculum, as a means to extend learning experiences and mathematical skills in safe but stretching environment.

Starting in the EYC with our Forest Kindergarten, all EYC pupils experience blocks of outdoor learning with qualified instructors. Pupils in the EYC have regular access to the outdoor environment (garden and orchard, play area) in which they explore, create and challenge their own thinking and that of others.

As pupils progress through the school, the Grounds for Learning training undertaken as a whole school allows staff to take advantage of outdoors to develop relevant learning experiences. This is further consolidated by the inter-disciplinary bodies of work such as the John Muir Award, STEM activities, Leadership Groups and Bikeability awards.

### 4. Develop updated progressive programmes in mental maths and problem solving

Our mental maths and problem solving programmes run throughout the school working on foundations created within the EYC. In both these mathematical areas we set high achievable goals based on prior exposure and practise of skills and strategies. Both mental maths and problem solving act as a bridge between different concepts, strategies and skills, which are taught through a systematic approach.

**Commented [03]:** A link to GfL? etc and past training and links to Mugdock/ John Muir Planner as an appendice?

**Commented [04R3]:**

In Milngavie Primary School teaching mental maths builds on the following teaching strategies and principles:

- The early introduction of practical approaches, visualising, imagining, jottings, modelling and imagining to carry out calculations as they secure their mental maths strategies.
- The early and sustained use where appropriate of concrete resources to develop practical experiences (resources can include - counters, interlocking cubes, coins, counting sticks, bead strings, Rekenrek, number lines, Numicon, interactive whiteboard, 100-squares, place-value cards, base 10 blocks, fractional shapes, shape nets etc.).
- Engaging learners through discussion of methods and strategies.
- Provide regular practice time with frequent opportunities for learners to use one or more fact/skill/strategy they already know to work out more facts.
- Regular teaching time committed to teaching and revising mental maths calculation strategies.
- Regular short practice to keep skills sharp and the mental mind map active and fresh.
- The use of higher order thinking skills, open and closed questions and hinge questions to allow extended learning in a supportive environment.

**Commented [05]:** What's this new resource approach Caroline and Denise know of but not shared?

#### 5.Ensure robust self-evaluation and quality assurance to drive forward improvements, through planning, implementation and embedding in the whole school curriculum

Milngavie Primary school and EYC acts in response to ongoing dynamic changes in education and the world of work. Our maths curriculum continues to be responsive to an ongoing cycle of self-assessment, reflection, moderation and quality assurance in line with Building the Curriculum 5, A Framework for Assessment.

EYC and school assessments use a variety of approaches and a range of evidence to develop a sound judgement regarding pupils understanding knowledge and skills in maths. Throughout the year formal assessments are used to support informal assessment data. Staff have a number of opportunities for moderation, to share standards and use these to develop engaging and appropriate programmes of study. This also allows good practices to be shared and high expectations to be developed to ensure progress and achievement in pupils' broad general education.

**Commented [06]:** Should we mention Progress and Achievement and BGE? (prob in later para?)

### Attainment of Goals in Supporting Vulnerable Pupils

Within our school and EYC we foster a nurturing approach to the education of our young people. We create and build on relationships with our pupils, their families and the wider school community, to develop a shared understanding of the needs of all our young people and their families. We endeavour to foster these relationships so that our children feel safe, are healthy, achieving, respected, responsible and included. All members of our school community are valued and we have effective strategies in place to support our young people facing challenges. We intervene to support and involve all stake holders to promote positive outcomes. To this end we are committed to providing additional support for the pupils in our school as and when required. and use the principle and practices of GIRFEC and HGIOS 4 to support our vulnerable pupils with their maths using a variety of strategies:

- Specific class based or group based structured and targeted maths such as 5 Minute maths Box, SEAL, Maths Recovery
- Use of online maths aids such as NRICH, Doorway, Whiterose Maths, CALL apps

We comply and actively engage with the statutory requirements and codes of practice as set out by the Scottish Government (Children and Young People (Scotland) Act 2014).

### Assessment, Self-Reflection, Tracking and Monitoring

High quality learning experiences are underpinned by effective learning and teaching, skilled use of assessment and self evaluation. Throughout the school and EYC we use a variety of methodologies and assessments to allow pupils and staff to track and monitor their maths, these include summative assessments provided by Quest, GL assessments and SNSA. Specific cross referenced assessments allow staff and learners to develop a shared understanding of the ultimate goals of the learning and teaching experiences.

The process of self-reflection allows the views of our learners, staff and the wider community to be sought, valued and acted upon to ensure robust, effective and appropriate learning and teaching. Training is put in place to support new initiatives and ensure plans in place are appropriate and robust. As an example the moderation of maths led to working parties to develop streamlined, effective and appropriate mental maths and problem solving. Inclusion in the School Improvement Plan and appropriate CPD opportunities allows development of capacity and cascading of information in the different areas of numeracy. Such initiatives underpin quality teaching to allow our learners to become effective, successful and confident as they progress on their maths journey. Together all these strands of information support, validate and reflect the needs of our pupils

**Commented [07]:** Hee Hee sounds like a cross between that posh 'white' shop and a Fortnum and Masons

**Commented [08R7]:** yep

**Commented [09]:** Should we cross ref to identifying areas to develop putting this into SIP and linking to CPD/Training calendar to show triangulation? – working parties...

**Commented [010R9]:**

### Strategy Paper Conclusion

As stated by the Education Endowment Foundation 'even small rises in attainment can lead to significant increases in lifetime productivity and outcomes, benefitting both the individuals concerned and the nation as a whole.'

The goals of this strategy paper centre round the continued engagement with all aspects of the maths curriculum with a particular emphasis on mental maths and problem solving. Through the implementation of effective programmes of study, reflective learning and teaching and a deeper intellectual engagement with the outcomes of the maths curriculum, we hope to affect all our pupils on their learning journey.

With this strategy paper and the goals set we must continue to learn from good practice, self-reflect effectively, use data effectively to support decision making processes and use all our human and practical resources to the best of our ability to ensure the best for all our learners.

Maths is important in our lives every day; the skills it equips us with have a lifelong impact. Milngavie Primary School and EYC strive to ensure that we equip pupils to the best of their abilities for the future.