



Stirling Council

**Fintry Primary School**

**Numeracy and Mathematics Policy**



Date agreed: February 2018

Bodies consulted: Staff, Children and Parents

Planned review date: January 2019

Planned review date: January 2020

# Numeracy and Mathematics Policy

## Rationale

*'To face the challenges of the 21st century, each young person needs to have confidence in using mathematical skills, and Scotland needs both specialist mathematicians and a highly numerate population.'*

*(Building the Curriculum 1)*

Mathematics permeates all aspects of modern life. Mathematics continues to grow in importance in the world of work, but mathematical capability has also become essential for improving one's personal life. Fostering excellence in mathematics is therefore not just vital to every nation's economic prosperity. It is also essential to creating an equitable society.

Numeracy is an important part of mathematical capability, but mathematics is more than just becoming familiar and fluent with numbers. Mathematical capability includes:

- Using and applying skills in the real world, including the appropriate use of information and communications technology (ICT)
- Being open to new ideas and alternatives, and appreciative of the importance of evidence, and critical reasoning
- Being curious, imaginative and diligent

Curriculum for Excellence provides a framework in Mathematics and Numeracy to ensure that all children and young people develop high levels of mathematics and numeracy skills. Within the mathematics framework, some statements of experiences and outcomes are also identified as statements of experiences and outcomes in numeracy. These form an important part of the mathematics education of all children as they include many of the numerical and analytical skills required by each of us to function effectively and successfully in everyday life.

The Numeracy Principles and Practice papers describes being numerate as:

*The confidence and competence in using number which will allow individuals to solve problems, analyse information and make informed decisions based on calculations.*

*(Numeracy Principles and Practice paper)*

The Mathematics Principles and Practice paper outlines the importance of mathematics in our everyday life and to make sense of the world around us.

*Mathematics equips us with many skills required for life, learning and work. Understanding the part mathematics plays in almost all aspects of life is crucial. This reinforces the need for mathematics to play an integral part in lifelong learning and the richness it brings.*

*(Mathematics Principles and Practice paper)*

## **Aims**

Within Fintry Primary we strive to ensure the highest standards of numeracy and mathematics are maintained throughout the school. Through a comprehensive numeracy and mathematics programme. We foster a challenging learning environment where learners are engaged and enjoy learning. Teachers will work to develop shared, high expectations of effort and success; teachers and learners together promote a culture of ambition. Learners will feel valued and supported enough to take some risks in learning. It is important that there is no artificial ceiling placed on the expectations of learners. Inclusion and equal opportunities for all and encourage pupils to take and share responsibility for their learning. In doing this it enables us to meet our school aims and raise attainment and achievement.

## **Objectives**

An active learning environment at Fintry Primary School ensure children have an opportunity to:

- engage in planned and structured numeracy and mathematics activities;
- extend their thinking and develop their mathematical skills;
- think deeply about mathematical ideas and concepts and construct their own understanding about them;
- analyse and make decisions, explain their thinking and synthesise aspects of their existing skills. In best practice, we challenge them to challenge themselves;
- use their existing skills and knowledge in different contexts, test out their ideas and conjectures, and solve problems; and
- work co-operatively and independently during numeracy and mathematics lessons.

## **Roles and Responsibilities**

Within Fintry Primary there is a sense of collective responsibility, consistency and high expectations from all members of staff, teaching and non-teaching.

### Headteacher

The headteacher is responsible for:

- managing the implementation of the Mathematics Policy;
- Supporting teachers to deliver a mathematics programme of study that ensures the seven principles of curriculum design: progression, depth, challenge & enjoyment, personalisation & choice, breadth, relevance and cohesion;
- Monitoring and tracking the progress of children;
- Managing the assessment of learning and teaching;
- Ensuring Learners' needs are met through a clear policy for Staged Intervention;
- Collegiate Moderation in Balfron Learning Community to ensure that the standard and quality of our work is high;
- Communicating with parents and external agencies when appropriate; and
- Ensuring that finances and resources are available to allow the full implementation of this policy.

### Principal Teacher

The principal teacher is responsible for:

- Supporting staff with planning, assessment and tracking of mathematics; and
- Liaison with Support for Learning Teacher to ensure all pupil needs are met.

### Teaching Staff

Teaching staff has responsibility for:

- Planning, organising and assessing lessons to ensure that the learning outcomes of Curriculum for Excellence are met;
- Sharing the purpose of learning with children at every lesson, including long-term and short-term learning goals;
- Justifying that every mathematics lesson has a link to real-life applications, and is used in other subjects, extends personal interests or is a necessary skill for future learning in mathematics;
- Evaluating children's progress and achievement and high quality feedback will be shared with children and this will inform planning of next steps in learning;
- a range of appropriate evidence is added to each child's Learning Journey; and
- Ensuring that policy implementation and curricular development enhances learning and teaching and contributes to raising achievement in mathematics.

### Support for Learning Assistants

It is the responsibility of Support for Learning Assistants to contribute to the schools policy in Numeracy and Mathematics through support for children in class, working in small groups and with individuals. Several staff members have been trained in a number of numeracy resources to support children in class:

- Plus 1
- Power of 2

### Children

Children have responsibility for:

- Children are encouraged to be actively involved in their learning in mathematics and to develop positive attitudes to mathematics.
- building positive relationships;
- participating fully in class lessons;
- evaluating their progress; and
- planning for their next steps in learning

### Parents and Carers

Parents and Carers are encouraged to play an active role in supporting pupils' learning in mathematics thereby fostering the home/school partnership.

## **Curriculum**

### Numeracy

The numeracy experiences and outcomes have been structured using eight organisers:

- Estimation and rounding
- Number and number processes
- Fractions, decimal fractions and percentages
- Money
- Time
- Measurement
- Data and analysis

- Ideas of chance and uncertainty

In numeracy, there will be an emphasis on developing a good range of flexible strategies for calculating mentally to enhance learners' progress and achievement in mathematics. Across all levels children will continually develop 5 main strategies:

- Counting on and back
- Partitioning
- Bridging and adjusting
- Complements to 10, 100 1000 etc.
- Doubling and halving

### Mathematics

The mathematics experiences and outcomes are structured within three main organisers, each of which contains a number of subdivisions:

#### **Number, money and measure**

- Estimation and rounding
- Number and number processes
- Multiples, factors and primes
- Powers and roots
- Fractions, decimal fractions and percentages
- Money
- Time
- Measurement
- Mathematics – its impact on the world, past, present and future
- Patterns and relationships
- Expressions and equations

#### **Shape, position and movement**

- Properties of 2D shapes and 3D objects
- Angle, symmetry and transformation

#### **Information handling**

- Data and analysis
- Ideas of chance and uncertainty

### **Whole School Programme**

To achieve appropriate pace, the children's rate of learning and their capacity to learn new concepts is carefully monitored by the teacher. Pace is not just about the speed of delivery but that the teaching helps children to learn through stimulating content. Children move through the CFE levels from early to second and at each level opportunities to develop, consolidate and be secure in key processes and skills for mathematical thinking. Heinemann Active Maths is the Core Programme of study. Teachers will make use of a wide range of active resources stored within the resource area in the Yellow Room. As appropriate teachers will enhance the core programme of study by selecting from a range of numeracy and mathematical resources within school.

### **Learning and Teaching**

Tasks and activities are planned to engage and challenge learners. Problem solving is at the heart of effective learning and teaching. Breadth through practise and application are established across a range of contexts, including familiar and unfamiliar situations. Connections are made through making conjectures and exploring ideas individually and with others. Depth is increased through higher-order learning activities, including discussing, explaining and making sense of important mathematical concepts.

Assessment is embedded in planning learning and teaching. Evaluations are made by the

teacher and next steps planned. Responsive planning which takes account of children's progress, interests and preferences. As a result of assessing learning on a continual basis, plans are developed to meet the needs of groups and individuals. Lessons make effective use of plenary sessions to encourage children and young people to reflect on learning, collaboratively identify next steps and transfer learning.

As learners progress, they should demonstrate an increasing sophistication in their ability to:

- Interpret questions
- select and communicate processes and solutions
- justify choice of strategy used
- link mathematical concepts
- use mathematical vocabulary and notation
- use mental agility
- reason algebraically
- determine the reasonableness of a solution

These skills should be evident across the learning in numeracy and mathematics. Teachers actively promote and develop these skills and ensure they are embedded in planning for learning, teaching and assessment.

At all levels, learners should be encouraged to identify relevant strategies for carrying out a range of tasks, communicate their thinking in different ways and explain and justify their answers. Developing mathematical language and notation is vital to ensure learners are supported to become confident in sharing their ideas and are mathematically articulate.

As learners progress in their understanding, they should be able to identify and use the links between mathematical concepts which enable the development of a range of flexible strategies for calculating mentally and the ability to manipulate numbers with fluency, accuracy and confidence.

At all stages, it is important to build on learners' algebraic thinking and reasoning skills. As learners progress, they should begin to use algebra in problems of increasing complexity and abstraction. Proficiency in interpreting questions is evidenced by learners' ability to choose, apply, communicate and justify their strategies using appropriate notation and mathematical vocabulary.

Estimation and rounding should feature regularly in learning and teaching and go beyond the learning of a set of procedural rules. Learners should routinely use estimation and rounding to determine the reasonableness of their solutions or calculations.

## **Approaches to Learning**

### Active

There will be an emphasis on active activities to ensure lasting learning. This does not mean that children need to be physically active while learning but that there should be opportunities for play and other activities that encourage children to engage cognitively with, and respond to their learning, to analyse and make decisions, explain their thinking, and synthesise aspects of their existing skills. Lessons will ensure an optimum amount of time will be spent on active learning, which encourages learner engagement in thinking and learner motivation. Children will have sufficient time to explore, make links, talk, explain, question, think, record, revisit and apply their learning.

### Outdoor

At Fintry Primary outdoor learning is embedded in the numeracy and mathematics curriculum. Children will have opportunities to develop their skills and knowledge outdoors:

- sort and categorise resources, equipment and naturally occurring objects;

- identify, understand and use numbers – both cardinal and ordinal, e.g. numbers on parking bays, number lines, number plates, counting games, rhymes, jingles and stories;
- develop appropriate mathematical language through counting games, rhymes, jingles and stories;
- recognise, explore and create patterns, shapes and colours, e.g. with leaves, pebbles and 2D shapes;
- match objects, e.g. match photographs with outdoor features;
- compare size, length, capacity and weight, e.g. playing on a see-saw;
- experience and talk about the routine and the passing of the time of day, the week, months and seasons;
- investigate and talk about patterns, colours and shapes in the outdoor environment, e.g. shapes of trees, leaves and clouds;
- sort, design, plan and build with a range of 3D shapes;
- explore spatial awareness through the different types of movement, e.g. balance, locomotion and manipulation;
- begin to understand and use positional and directional words – forwards, backwards, in front of, behind, above and below; and
- use mathematical language such as heavy, light, full, empty, long, short etc., in relevant contexts.

### Collaborative

“Talking is central to teaching mathematics formatively and providing opportunities for students to express, discuss and argue is essential. Through exploring and ‘unpacking’ maths, students can begin to see what they know and how well they know it.”

*Jeremy Hodgen and Dylan Wiliam, Mathematics inside the black box, 2006*

Effective teaching also necessitates maximizing the opportunities for children to work collaboratively. Interacting with others to share understanding, develop and explain thinking and to explore and demonstrate learning ensures that learners are engaged and active on classroom.

### Independent

Independent and collaborative learning ensures success. Independent learning puts learners at the centre of their own learning. It depends on the learner being self-motivated and confident enough to make informed decisions. As part of working independently, they are not solely reliant on their teacher but are accountable for their learning. Being able to work independently - either individually or in groups helps learners to pursue mathematical interests and solve problems, as well as develop, more generic skills including leadership responsibility, resilience and team work that are essential for life long learning.

### ICT

Teachers make good use of information and communications technology (ICT) to promote understanding and to enliven teaching and learning and, as part of homework tasks, to engage and motivate learners. ICT plays a key role in the delivery of the curriculum, by motivating learners, supporting different kinds of learning and as a tool when using or applying mathematics.

### **Attainment**

Progression initially comes through learners developing their knowledge and understanding in the basic concepts such as the concept of number in numeracy and mathematics. Once mastered, learners can then use these building blocks to demonstrate breadth, challenge and application.

*Mathematics is a sequential subject; the learning achieved at each stage of development of a skill provides the foundation for learning at the next stage. Each stage of development,*

*however, benefits from being reinforced through challenging practice, including through contextualised problems and applications across learning, in real life and in the workplace. Therefore as well as making progress through the stages of mathematical concept or skill, a learner can also make progress in their capacity to apply that skill in an appropriate way.*

(Excellence in Mathematics Report March 2011)

Attainment in learning is carefully tracked through the Heinemann Active Maths programme of study. A progression framework is in place and tracks pupil progress. Individual records are kept of every child's progress; this is regularly monitored and tracked by the Class Teacher and Headteacher. If a child is not on track to reach the appropriate level then support will be put in place. Parents will be informed and consulted on decisions made by teaching staff.

In mathematics, there is an emphasis on well-planned learning, teaching and assessment to provide opportunities for learners to experience breadth, challenge and application across the significant aspects of learning in numeracy and mathematics.

Learners demonstrate **breadth** in numeracy and mathematics when they:

- work confidently with an increasing number of connected experiences and outcomes
- identify the mathematical ideas and concepts required to interpret questions
- use an increasing range of mathematical language and notation, formula and equations
- use an increasing range of mathematical tools.

Learners are provided with **challenge** in numeracy and mathematics when they can:

- approach increased complexity of questions involving more steps and operations
- work with open ended questions and tasks
- use an extended range of mathematical knowledge in tasks
- interpret increasingly complex numerical information and use this to draw conclusions, assess risk, make reasoned evaluations and informed decisions
- communicate understanding by articulating ideas, approaches and processes with increasing clarity, both orally and in written form

Learners demonstrate **application** of their numeracy and mathematics when they:

- make connections and apply knowledge, understanding and skills across the numeracy and mathematics experiences and outcomes
- use numeracy and mathematical skills in other curricular areas
- understand and explain how numeracy and mathematics impacts on the world of learning, life and work

## **Assessment**

The process of assessing pupils' progress is set in a context of effective learning and teaching that takes account of the five key teacher activities of planning, teaching, recording, evaluating and reporting. Formal and informal assessment is used:

- to give pupils clear and regular feedback;
- to assist learners and teachers identify the next steps in the learning process which will ensure progression; and
- to evaluate the effectiveness of learning and teaching.

Assessment is an integral part of learning and teaching. Assessment evidence is derived from the four contexts of learning: classroom activities, interdisciplinary learning, the ethos and life of the school and from personal achievements, including those outwith the school. To make a holistic judgement of learners' achievements, a collection of evidence on more than one occasion is required. No single task or test can validly reflect learners' achievements in



numeracy and mathematics. A range of key assessment strategies is known to have a positive impact on learning:

- sharing the purpose of learning
- ethos of learning and peer support
- teacher observations for on-going assessment
- promoting quality discussion
- self and peer assessment
- target setting and personal learning planning
- summative assessment of applying skills
- reflecting on learning and informing next steps.

Each statement from the 'Experiences & Outcomes' framework is not assessed in isolation but is considered collectively in the assessment of learners' depth of knowledge, understanding and skills. Well-constructed assessments in numeracy and mathematics, taking cognisance of breadth, challenge and application, support staff in their professional judgement of learners' progress in achieving a level. This includes learners making connections across a range of experiences and outcomes, using higher order thinking skills and applying them in new and unfamiliar contexts. Learners should be encouraged to show, explain and justify the range of strategies they use. Children will participate in Holistic Assessments and Context Assessments from Heinemann Active Maths as they progress through the Early, First, Second and Third Level.

At Fintry Primary School Curriculum Planning provides clear and concise Learning Outcomes and Success Criteria to be shared with children. Learners use the shared purpose of learning alongside the related success criteria to reflect on how successfully they have learned. Self and peer assessment contributes to an holistic judgement on learning. Through formative assessment teachers support children through giving quality feedback to identify their next steps in learning.

Summative assessment 'Assessment for Excellence' is used annually from Primary 3 and is used to monitor progress and inform learning and teaching. CEM 'Assessment for Excellence' systems are designed in conjunction with Curriculum for Excellence to meet the requirements of Building the Curriculum 5. This assessment measures progress in Numeracy, Mathematics and Mental Maths.

Additionally, a summative assessment using the Heinemann Active Maths Question Banks will be administered as they progress through a level. Children will receive a summative assessment based on the Question Banks at the developing, consolidating and secure stages for Heinemann Active Maths. This diagnostic assessment compliments the professional judgments of teachers regarding the children's progress in Numeracy and Mathematics. Additionally it allows teachers to target any gaps in learning and if any child is not on track to meet the expected level then appropriate support will be put in place.

### **Support for Pupils**

Throughout planning and implementation provision is to be made to cater and support the needs of the individual. Staff use Girfec to make a positive difference for children in their readiness to learn. At Fintry Primary School all children will be encouraged to participate in all activities to the best of their ability. Teachers strive to ensure that individual needs are met through evaluation and identification of next steps. Children requiring support or extension are identified and provided with an appropriate programme of development. Reporting to parents will be specific and in clear language to promote effective communication between school and home.

### **Nursery/Primary/Secondary Transition**

Joint planning, including Learning Community planning, takes place to enable mathematics to meet the central principles and practices of the CFE curriculum. Effective communication at transition stages is essential to ensure progression in knowledge and skills which takes account of prior learning and makes effective use of the knowledge of each child as a learner. Transfer of information takes place in line with Stirling Council guidelines.

## **Homework**

*“Homework provides rich opportunities for children and young people to demonstrate, extend and explore learning through a variety of exciting and enjoyable activities. Homework is one piece of the teaching- learning picture and in best practice is connected to what happens in the classroom. Quality homework tasks allow learners to practise or process information, introduce them to material that will be discussed in the future, or provide feedback to teachers so they may check for understanding.”*

*(HMIE, Learning Together in Mathematics, 2010)*

As well as reinforcing concepts, effective homework:

- Has a clear purpose and demands active learner engagement
- Provides opportunities for parents and young people to talk about learning in mathematics;
- Real life connections and applications; and
- Develops higher order skills such as applying, analysing, creating and evaluating.

## **Resources**

The Headteacher and members of the leadership team will ensure that Fintry Primary has appropriate up to date resources to support learning and teaching in mathematics; these include books, pupil materials, ICT resources, interactive white board, practical materials and games. Within the school, the management team ensure that the responsibility for the organisation and planning of resources is clearly understood by all staff, that inventories are drawn up and resources are stored in ways that facilitate accessibility by pupils and staff. Pupils' work is displayed appropriately to promote learning and encourage positive attitudes to mathematics. Staff development needs in mathematics are identified through the Professional Review and Development process, which is integrated within annual collegiate activities.

## **Management, Leadership and Quality Assurance**

School aims are shared with staff, children and parents through the School Improvement Plan, School Handbook and parental workshops. All planning, evaluations and assessments is tracked and monitored by the headteacher. Curriculum Plan feedback sessions ensure that learning and teaching meets the principles of CFE. Tracking and monitoring meetings are carried out each term between the headteacher and class teacher to allow professional dialogue on progress and attainment of children. Senior management are involved in classroom observations which include Numeracy and Mathematics.